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SELECTED ECONOMIC TRANSLATIONS ON EASTERN EUROPE

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SELECTED ECONOMIC TRANSLATIONS ON EASTERN EUROPE

INTRODUCTION

This is a serial publication containing selected translations on all categories of economic subjects and on geography. This report contains translations on subjects listed in the table of contents below. The translations are arranged alphabetically by country.

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HUNGARY

Input-Output Table of the Hungarian People's Economy

[This is a translation of an article by Zoltan Kenessey, Chief, International and Study Section, Central Bureau of Statistics, and Managing Editor of Statisztikai Szemle, published in Statisztikai Szemle, No 12, December 1959, Budapest, pages 1174-1190; CSO: 3384-N]

The theoretical groundwork for a detailed statistical study of the structural interrelations of the various sectors of the Hungarian national economy was begun in 1955. In this stage of theoretical preparation it was necessary both to review the experiences acquired abroad and to clarify certain principles that were to set the further course of action and then to decide whether or not an input-output table of the Hungarian national economy should be compiled at all. On the basis of the pertinent articles published in Statisztikai Szemle and Kozgazdasagi Szemle, as well as the debates held on this subject, the consensus of opinion among Hungary's economists and statisticians was that a detailed study of the input-output relations of the Hungarian economy was unquestionably necessary.

According to the views crystallized in the course of the theoretical debates, the compilation of an input-output table has the following advantages.

1. A better knowledge of the economic structure and an unprecedented amount of information on structural interrelations permit more detailed economic analyses and can be of considerable importance with respect to economic research and measures of economic policy.

2. The compilation of an input-output table permits a multilaterial comparison and check on the structural interrelations and can reveal certain shortcomings of the statistical system.

3. The information obtained on the structure of the national economy and the computed technical coefficients are valuable aids in economic planning.

It would have been unwise, however, to expect too much of the compilation of the first input-output table. Thus, when the December 1957 conference[1] of economists, statisticians, planners, mathematicians, etc. resolved to begin work on the compilation of the input-output table, it also emphasized the need for a certain amount of caution in the first stage of the work. This cautious approach was justified for several reasons. First of all, it was necessary to take into consideration that the structural interrelations reflected in the 1957 input-output table would be characteristic only of that year but not for the preceding or subsequent years (primarily because of the extremely high import and low export volumes). Furthermore, the 1957 input-output table had to be compiled on the basis of the then existing statistical report system, which did not take into consideration the special requirements for the compilation of such a table. It was already evident that in many cases various methods of estimation would have to be employed, which in turn would affect the quality and accuracy of the data. The well-known shortcomings of the 1957 price system and their effects on interrelations expressed in terms of value also justified a certain amount of skepticism on the part of the experts who were to compile the 1957 input-output table.

Despite these reservations, it seemed justifiable to begin work on the compilation of the table. After about six months of preparation, the Central Bureau of Statistics (Kozponti Statisztikai Hivatal) in the summer of 1958 began to compile the input-output table on the basis of the 1957 annual [enterprise] statistical reports, which were modified to a certain extent in accordance with the requirements of the work involved. The work proceeded rapidly. The Central Bureau of Statistics published Hungary's first detailed input-output table in the summer of 1959.[2]

In this article I would like to discuss the work required to compile the 1957 input-output table and to compare it with similar foreign tables. The complexity of this subject does not permit a review of all the problems involved. I merely wish to select and analyze a few problems which I consider important and suitable to serve as a basis of comparison.

I

In Hungarian statistics, some attempts had already been made during the past decade to study the structural interrelations of the national economy. For three subsequent years of the early 1950's, so-called checkerboard balance sheets were compiled to show the interrelations of the general sectors of the national economy. As we well know, the basic idea of arranging the breakdown of the national product in a checkerboard table originated in the Soviet Union. In 1926, for the first time in the history of statistics, the Soviet Union compiled and published a detailed balance of the national economy for the 1923-1924 period.3 Among other things, this balance included a checkerboard table of the national production broken down into 17 sectors.

The Hungarian tables for 1951, 1952, and 1953 had a more general breakdown and included only six main sectors of the national economy. At the time of their publication, these tables failed to arouse any special interest. This fact, in my opinion, can be attributed primarily to three closely connected and interrelated causes. First, in many cases these tables were based on comparatively rough estimates which limited the usefulness of the data. Secondly, the breakdown of the tables was too general. (For example, all branches of industry were merged into one sector.) Thirdly, economic planners at that time did not attribute the same importance as today to a detailed knowledge of the structural interrelations of the national economy. Naturally, all three reasons existed separately, but they also affected each other. Furthermore, these tables were not widely accessible, which fact also limited their usefulness.

As a supplement to the history of Hungarian input-output tables, we present below the data of the checkerboard tables for 1951-1953, and the technical coefficients computed on the basis of these data. (The numbers beginning with zero and containing six decimal points are the technical coefficients.)

In the early 1950's the tables for 1951, 1952, and 1953 were published separately, but the technical coefficients were not yet computed at that time. The averages for the period 1951-1953 and the technical coefficients were computed only in 1956. It must be emphasized, however, that we are presenting this table not because of its suitability for

Checkerboard Table of the National Product*
at Current Prices, in Million Forints
(Average for the 1951-1953 Period)

		1 Industry	2 Construction Industry	3 Agriculture	4 Transportation	5 Commerce	6 Export	Total
Industry	1	25081 0.309885	906 0.078402	5837 0.202128	1121 0.225523	4146 0.284519	10240 0.860218	*81 015*
Construction Industry	2	2363 0.041511	546 0.047540	45 0.001560	1855 0.359690	39 0.002675	—	*11 486*
Agriculture	3	1708 0.021021	191 0.016630	6499 0.225161	277 0.055234	686 0.047191	962 0.072418	*28 736*
Transportation	4	1159 0.014320	542 0.047714	110 0.003829	167 0.033200	64 0.009018	250 0.021001	*5 015*
Commerce	5	1206 0.014886	139 0.012102	—	1031 0.205583	88 0.006056	537 0.045111	*14 579*
Import	6	4870 0.060112	339 0.029517	163 0.000472	—	—	—	*5 372*
Total		*81015*	*11486*	*28736*	*5015*	*14579*	*11904*	

*The table, presented here in abridged form, contains only six sectors and the totals. These six include the productive sectors that are of primary importance for computing the technical coefficients plus the foreign trade sector.

economic analysis but merely to give a complete history of the input-output tables in Hungary. For the reasons mentioned above, the usefulness of this table for economic analysis is rather limited.

Among the studies exploring the structure of the national economy, special mention must be made of the following two works. One is a diagram compiled under the guidance of Ferec Janossy in 1953, which--although not in the usual matrix form--strives to show the interrelations of the five basic sectors of the national economy. The other is a matrix completed by Andras Brody[4] showing the interrelations between the five sectors of heavy industry (coal-mining, iron and steel production, electric power generation, the machine industry, and transportation).

II

At the very start of the compilation of the input-output table, it was evident that the table for 1957 would not be a continuation of the tables outlined above but would have

to represent a further improvement in the structural analysis of the national economy. This was reflected in the fact that even the most conservative proposals called for a 1957 input-output table with at least 30 sectors. The original plan at the start of the project was to include 55 sectors in a 55 x 55 table. (The input-output table recently published contains 47 sectors, primarily because in the course of its compilation it became necessary to merge several industrial sectors. Actually, however, this table was compiled in a breakdown even more detailed than the 55 sectors originally planned.)

The considerable attention devoted to the methods for compiling the 1957 input-output table also showed that the statisticians, economists, and planners were attaching more importance to this table than to the previous small ones. An Input-Output Table Committee (Agazati Kapcsolatok Merlege Bizottsag) was formed within the Central Bureau of Statistics. Representatives of the National Planning Bureau (Orszagos Tervhivatal) and the Institute of Economics (Kozgazdasagtudomanyi Intezet) also took part in the work of this committee.

The interest of organs other than the Central Bureau of Statistics was not confined to debating the methods to be used. The individual staff members of several scientific institutes took an active part in the actual compilation of the input-output table. Their contribution has unquestionably been valuable, primarily with respect to certain special sectors.

It may not be entirely meaningless to emphasize that in Hungary the central statistical agency initiated and compiled the input-output table, in close cooperation with other important government organs and with the support of the National Planning Bureau. This has proved beneficial with respect to the compilation of the input-output table. In this manner we have been able to eliminate the organizational difficulties which obstructed the work--for example, in Italy, where the table was not compiled by the central statistical agency. In foreign countries, the input-output tables are usually compiled by the central statistical agencies. In Poland, Norway, England, and Yugoslavia, for example, the input-output tables are published by the central bureaus of statistics. (The Soviet Central Bureau of Statistics has also decided to compile an input-output table.) In France, on the other hand, the input-output tables are compiled by the Study Section of the French Ministry of Finance. In the United States the input-output tables are compiled by the experts of the Bureau of Labor Statistics.

In view of its complex nature, the successful compilation of an input-output table requires a good command of almost all statistical fields. In principle, therefore, it is best to assign this work to a central statistical agency. Furthermore, one advantage of an input-output table lies in that its compilation can reveal certain shortcomings in the nation's statistical system, minor or major discrepancies in the statistical data, etc. These shortcomings and discrepancies can be remedied best if the work is done by a central statistical agency.

In connection with the compilation of the input-output tables, the roles of the central bureaus of statistics can be expected to develop in the same manner as in the computation of the national incomes. In most countries, including Hungary, the national incomes were computed at first (generally until the outbreak of World War II) by various economic institutes. This was in contrast to the practice developed in the Soviet Union. There the computation of the national income has always been assigned to the jurisdiction of the Soviet Central Bureau of Statistics, founded in 1918. Today the national incomes are being computed by the central statistical agencies, not only in the socialist countries but in the majority of the capitalist countries as well. Without wishing to overestimate the organizational problems involved, in our opinion the further compilation of input-output tables in Hungary will profit from the fact that this work has been assigned from the very beginning to the Central Bureau of Statistics. The comparatively short time needed to compile the first Hungarian input-output table serves to substantiate this view. In the United States, on the other hand, Leontief began to compile the first input-output table for ten sectors in 1931 but published his first report only in 1936.[5] The first (50-sector) version of the report which the US Department of Labor compiled for 1947 was published only in 1951.[6] In Italy, theinput-output table for 1956 is being compiled under the supervision of Professor Vera Cao-Pinna, partially on the basis of the projected 1953 data. To the best of our knowledge, this report will be published late in 1959.[7] The time within which the Hungarian input-output table was compiled is short, even in comparison to those compiled by central statistical agencies in Western countries. Noway, for example, published the 1948 table in 1952,[8] and the 1950 table in 1954.[9] In Hungary, on the other hand, the 1957 input-output table was published in December 1959.

III

The 1957 Hungarian input-output table presented here has 47 sectors in all. These include 32 industrial sectors (31 sectors for the socialist industry and one sector for the private small-scale industry) and two sectors for the construction industry (the socialist and the private). Agriculture, transportation, and commerce each represent one sector. There is a sector for "other productive activities" and a sector for the sums that were left undivided.

In view of the fact that this was Hungary's first input-output table, the size of the matrix can be regarded as adequate. The extent of the breakdown in the input-output tables published abroad varies according to country, depending partially on how detailed the compilation is and partially on the problems of reproduction. The 1947 American input-output table is broken down into 500 sectors. The data are recorded on about 20,000 punch cards. To date only an abridged input-output table has been published, containing 50 sectors. There are plans to publish the data in a somewhat more detailed breakdown, according to 100 but not more than 200 sectors. We have been informed that the input-output table which is now being compiled in England will contain nearly 400 sectors. It is very likely that the data will not be published in complete detail, because it would be extremely difficult to handle a square matrix of this size. (In the course of our Norwegian study tour, we learned that the Norwegians find it difficult to manage a large matrix even in the control stage.) The 1957 Polish input-output table contains 35 x 32 sectors.[10] The 1954 British table has 18 x 20 sectors. The 1950 Norwegian table is based on 78 sectors, but these were abridged into 33 for publication. The 1953 Italian table has 32 sectors, and the 1955 Yugoslav table has 37.

The foreign input-output tables published in recent years are generally more detailed than the Hungarian input-output table for 1957 published this year [1959]. The importance of the detailedness of an input-output table, however, should not be exaggerated. In addition to detail and ease of handling, the quality of such a table depends on many other factors as well. Furthermore, the Hungarian input-output table is more recent than any of the tables mentioned above, with the sole exception of the Polish table, which is also for 1957. In view of the general trend toward more detailed tables, it is very likely that the foreign tables to be published

	Productive sectors \ Consumer sectors	Coal mining & briquet production	Petroleum & natural gas production	Other mining (peat, ore, minerals)	Iron & steel production	Metal production	Machinery
		1	2	3	4	5	6
1	Coal mining & briquet production	208,2	0,1	2,8	58,6	45,3	
2	Petroleum & natural gas production	–	19,4	–	4,4	–	
3	Other mining (peat, ore, minerals)	–	1,4	10,0	262,3	62,6	
4	Iron and steel production	91,8	8,4	8,1	1 384,4	67,0	1 0
5	Metal production	3,4	0,9	0,8	24,4	612,8	2
6	Machinery production	92,3	8,6	15,6	88,6	5,8	1 6
7	Electrical machinery & appliances	36,3	2,5	7,8	27,9	4,8	4
8	Electronics production	0,1	–	0,9	2,8	16,3	
9	Instrument industry	8,3	–	–	3,4	1,3	1
10	Iron & metal mass goods production	55,9	–	15,0	40,0	7,9	3
11	Power industry	135,0	10,8	18,5	116,1	116,7	1
12	Construction materials industry	47,2	–	3,5	162,5	6,2	
13	Petroleum refining	47,0	4,5	9,2	114,9	24,5	
14	Municipal gas production	7,2	–	–	10,9	5,0	
15	Chemical by-products of coal	49,9	1,3	0,1	378,4	39,2	
16	Industrial gas, dyes, and other heavy-chemical products	76,0	0,5	9,6	29,6	15,2	1
17	Pharmaceutical industry	0,3	–	0,4	1,3	2,6	
18	Household chemicals, cosmetics, starch & photo-chemicals	8,0	–	–	2,4	1,0	
19	Other organic chemical production	0,1	–	0,1	17,4	26,5	
20	Processing of rubber & synthetics	30,7	0,5	4,4	18,4	3,2	3
21	Lumber industry	32,8	0,2	1,9	9,0	3,1	
22	Paper industry	9,2	1,0	5,0	8,6	4,0	
23	Printing industry	4,5	–	–	5,0	2,5	
24	Cotton industry	–	–	0,2	3,8	0,7	
25	Wool & silk industries	–	–	–	–	–	
26	Fibers, flax, hemp, jute, dry goods	2,1	1,1	1,0	15,0	5,1	
27	Tanning & fur finishing	–	–	–	9,0	2,0	
28	Clothing & knitware industries	60,1	1,0	2,9	14,5	7,0	
29	Shoe, leather & fur industries	8,2	0,5	0,5	–	0,1	
30	Food industry	3,2	0,5	0,4	8,0	3,8	
31	Miscl. & domestic industries	–	–	–	2,0	0,5	
32	Total socialist industry (1–31)	1 012,8	65,0	118,2	2 818,6	1 092,2	5 24
33	Construction industry	31,6	0,8	–	3,0	10,6	
34	Private construction	–	–	–	–	–	–
35	Private small-scale industry	–	–	–	–	–	
36	Agriculture	200,0	–	8,0	8,0	1,4	
37	Transportation	269,1	31,1	7,8	200,0	10,7	8
38	Commerce	40,1	6,1	5,6	113,3	7,0	5
39	Other productive activities	16,0	–	0,2	4,4	3,2	2
40	Undivided portion	38,8	1,0	1,1	–	–	55
41	Total (32–40)	1 608,4	102,0	140,8	3 174,3	1 124,5	5 97
42	Amortization	454,7	149,2	53,3	447,3	142,4	44
43	Wages, rents, accumulation	603,2	62,0	149,9	686,4	437,8	4 51
44	Production (41–43)	2 666,3	313,2	344,1	4 308,0	1 704,2	10 92
45	Inventory reduction	–	–	–	–	–	–
46	Import	661,6	321,4	322,9	640,7	465,7	1 41
47	Total resources (44–46)	3 327,9	634,6	667,0	4 948,7	2 169,9	12 33

Machinery production	Electrical machinery, appliances	Electronic production	Instrument industry	Ironmetal mass goods production	Power industry	Construction materials industry	Petroleum refining	Municipal gas production	Chemical by-products of coal	Ind. gas, dyes, heavy chemicals	Pharmaceutical industry	Household chemicals, cosmetics
6	7	8	9	10	11	12	13	14	15	16	17	18
57,0	6,0	12,0	3,6	12,0	513,2	195,3	0,4	151,3	205,6	15,2	8,1	
7,8	0,2	–	–	–	–	3,1	513,5	9,9	0,1	0,7	–	–
7,3	–	2,0	–	1,4	4,2	8,8	0,1	–	–	78,5	2,0	–
1 063,8	142,9	27,2	22,3	302,8	73,0	62,6	3,3	6,9	6,3	5,8	4,4	
253,7	360,8	15,7	49,7	115,0	8,0	8,4	0,1	0,4	1,7	53,5	1,7	
1 657,4	66,8	119,1	9,3	87,7	35,2	47,4	7,1	9,6	6,9	56,0	10,3	–
479,6	200,1	40,1	18,7	15,4	74,0	7,7	2,1	0,7	2,5	5,4	2,9	
28,0	3,9	340,5	19,0	14,0	12,3	5,6	–	–	0,7	0,7	23,0	–
168,7	50,7	53,2	196,1	63,3	1,4	2,0	0,9	–	0,9	0,1	3,3	
368,3	34,7	22,5	14,4	309,1	27,5	71,5	14,5	7,9	0,7	31,7	23,0	2
126,3	15,7	13,9	5,2	15,5	147,7	65,0	5,2	4,3	13,7	40,5	8,5	
43,3	1,5	20,9	10,2	3,9	24,5	204,3	0,5	0,9	6,0	16,8	22,1	1
59,8	6,0	10,0	4,0	12,7	37,5	27,3	83,4	2,0	1,9	29,5	2,5	1
17,6	3,2	1,5	3,7	22,4	1,5	12,4	0,1	–	9,7	13,3	3,5	
43,1	2,3	1,1	1,0	7,1	1,0	4,7	3,4	7,1	4,5	47,6	4,8	
184,9	17,6	35,3	3,7	20,7	8,4	60,0	14,0	3,2	4,1	117,5	50,7	4
0,8	7,0	0,5	1,0	0,7	0,7	0,3	–	0,3	0,2	11,7	163,5	3
2,7	–	1,5	1,3	7,2	0,4	17,9	1,5	–	0,3	2,6	7,4	3
18,3	9,2	7,3	0,8	11,2	0,1	1,2	7,6	–	3,3	60,8	73,7	7
349,8	34,3	39,0	20,2	72,3	7,4	24,6	1,0	0,9	0,5	8,6	10,7	1
90,3	17,7	48,9	9,0	22,4	1,1	43,1	3,2	–	0,7	4,8	5,2	
21,9	27,0	33,5	5,5	6,5	1,2	31,5	1,4	–	0,4	29,9	16,2	2
8,0	1,8	2,8	2,0	1,9	5,8	6,0	0,2	0,5	0,8	0,2	12,0	
26,0	19,0	–	0,8	11,0	0,6	15,0	1,0	–	–	0,5	9,8	–
16,2	12,7	2,0	–	6,4	0,8	1,9	–	–	–	0,1	–	–
11,3	12,7	0,5	1,3	18,6	1,5	2,3	1,3	0,1	0,1	9,8	3,3	
2,1	–	–	2,1	0,7	0,1	16,9	0,1	0,5	0,1	0,4	2,1	–
30,0	15,6	8,0	9,0	8,0	7,8	33,5	0,0	1,5	1,7	8,1	4,2	
5,0	–	1,2	–	1,4	4,2	11,5	0,4	0,1	0,8	0,7	1,3	–
59,0	6,0	2,1	1,9	5,4	2,3	31,6	25,2	–	–	67,8	49,0	23
27,0	–	0,2	–	20,5	7,3	3,0	0,8	–	0,5	0,3	–	–
5 249,5	1 075,4	862,5	415,8	1 197,2	1 010,7	1 026,4	692,9	208,1	274,5	719,1	529,2	57
0,2	–	–	–	0,8	8,4	–	–	–	1,3	3,8	11,9	
–	–	–	–	–	–	–	–	–	–	–	–	–
1,0	–	–	–	0,3	–	–	–	–	–	–	–	–
3,0	–	–	–	7,2	8,8	25,5	–	–	–	0,4	115,2	8
88,4	6,5	4,2	2,9	46,2	142,9	75,4	7,4	4,4	11,5	44,5	12,2	1
57,1	5,0	4,0	3,6	20,1	1,6	14,7	2,0	0,5	1,7	2,4	6,0	
20,5	–	0,2	–	1,8	13,8	22,9	3,0	–	2,7	–	5,9	1
551,5	41,2	14,9	0,8	186,1	37,8	5,0	2,0	3,9	2,7	47,0	15,6	1
5 971,2	1 128,1	885,8	423,1	1 460,2	1 224,0	1 169,9	707,3	216,9	294,4	817,0	696,0	66
444,9	46,5	58,3	25,4	107,7	500,0	214,6	47,0	46,3	36,1	121,6	58,5	
4 511,0	920,6	1 120,5	787,0	2 398,8	1 105,8	1 600,4	1 918,9	171,8	— 8,9	884,9	676,1	56
10 917,1	2 095,2	2 059,6	1 235,5	3 966,7	2 829,8	2 984,9	2 673,2	434,5	321,6	1 773,5	1 425,6	1 17
–	–	–	–	–	–	–	–	–	–	–	–	–
1 410,7	154,6	173,9	348,4	265,3	76,1	265,6	176,8	16,0	446,3	651,0	139,3	210
12 317,8	2 249,8	2 233,5	1 583,9	4 230,0	2 905,9	3 250,5	2 850,0	450,5	767,9	2 424,5	1 564,9	1 38

PUT-OUTPUT TABLE OF THE HUNGARIAN PEOPLE'S ECONOMY

dustry	Household chemicals, cosmetics, starch, photo	Other organic chemical production	Processing of rubber & synthetics	Lumber industry	Paper industry	Printing industry	Cotton industry	Woollen industries	Fiber, flax, hemp, jute, dry goods	Tanning & fur finishing	Clothing & knitware industries	Shoe, leather & fur industries
	18	19	20	21	22	23	24	25	26	27	28	29
	4,7	8,6	10,4	4,4	15,6	1,2	31,5	12,8	7,7	10,3	6,1	2,
	–	–	21,1	–	0,5	–	0,1	–	–	–	–	–
,0	–	0,3	5,5	–	4,2	–	–	0,1	2,4	0,4	–	–
,4	3,5	1,7	6,4	4,7	1,0	0,2	4,2	1,8	1,7	11,1	0,4	1,
,7	0,2	2,6	0,8	–	3,2	0,7	1,8	0,6	1,3	0,9	3,4	0,
,2	–	1,3	11,2	3,4	3,5	5,0	34,3	5,4	10,7	–	30,4	54,
,3	0,8	0,9	2,1	2,4	0,3	0,7	1,9	0,7	0,7	0,5	1,5	0,
	–	0,5	0,9	–	0,1	–	–	–	–	1,3	–	–
	0,1	0,6	0,6	0,4	–	–	0,1	0,1	0,1	–	0,2	–
	21,0	6,1	25,1	91,6	4,6	2,1	7,5	2,9	7,6	31,0	18,2	24,
	2,7	5,5	12,5	17,5	18,8	4,8	50,3	20,6	12,7	3,6	17,2	8,
	14,4	2,4	3,0	39,6	0,6	–	1,0	0,4	2,2	0,3	0,4	0,
,5	1,2	7,2	3,1	6,9	8,3	0,9	20,5	5,0	2,4	6,5	3,5	1,
,5	1,0	4,0	0,7	4,8	2,5	–	0,3	1,3	0,5	0,2	1,4	0,
,8	0,1	9,8	28,2	8,6	0,3	0,1	1,4	–	–	0,9	0,2	3,
,7	45,0	40,9	6,1	72,4	–	29,6	92,5	10,1	16,3	3,2	6,9	10,
,5	36,7	1,0	1,1	0,2	0,2	0,2	0,4	0,3	0,1	0,4	0,1	0,
,4	24,8	1,8	1,4	2,1	14,4	8,0	8,8	6,2	5,4	7,0	16,2	34,
,7	75,9	69,3	138,0	4,8	14,0	1,0	132,6	168,6	66,7	47,8	11,5	18,
,7	10,0	2,8	24,4	13,1	3,7	1,6	5,5	0,8	17,5	1,9	209,8	38,
,2	3,2	2,4	0,7	467,9	0,6	0,1	11,8	11,7	5,4	1,3	8,8	25
,2	39,7	13,1	8,5	20,2	240,9	226,8	34,7	1,3	3,9	0,6	42,1	35,
,0	8,0	0,8	1,5	6,2	2,0	11,6	3,6	2,0	1,1	1,2	4,5	1,
,8	–	1,0	151,6	9,5	2,1	7,8	872,4	59,3	143,9	18,3	2 582,4	133
	–	0,1	6,8	19,5	1,5	–	60,4	413,6	8,4	5,1	2 135,2	9,
,3	0,5	1,6	119,6	12,7	5,0	–	17,1	12,5	451,2	10,2	340,3	49
,1	–	0,1	1,2	1,7	0,4	0,1	9,9	3,8	2,4	103,3	0,5	699
,2	2,0	2,1	11,1	15,4	1,4	0,9	10,4	4,6	3,1	4,3	77,3	74
,3	–	0,8	0,4	0,8	–	–	5,0	–	–	–	0,1	39
,0	231,9	41,7	15,2	24,1	9,5	6,1	17,0	7,6	6,7	348,0	14,0	1
	–	0,4	1,2	–	3,0	–	10,0	5,0	5,0	16,0	37,0	5
,2	576,9	231,8	618,5	853,9	361,8	311,1	1 446,8	759,3	783,1	635,8	5 573,6	1 262
,9	0,2	–	5,7	10,3	2,6	3,7	6,0	3,5	2,8	2,6	4,2	3
	–	–	–	–	–	–	–	–	–	–	–	–
	–	0,8	1,3	–	–	–	–	–	–	–	–	–
,3	52,4	–	166,1	382,3	36,4	–	604,0	447,7	139,8	117,4	9,8	26
	10,3	3,9	5,6	31,4	19,7	2,8	20,0	7,3	13,4	10,8	37,3	6
,1	4,9	4,3	11,0	6,8	10,6	1,7	15,0	–185,8	3,9	41,0	60,5	17
,2	1,0	0,9	2,4	12,6	48,3	1,1	18,3	42,0	–44,6	38,1	3,2	11
,4	10,9	5,8	5,5	6,0	14,4	–	0,8	1,9	8,7	0,4	118,5	1
,7	616,6	247,6	816,1	1 353,3	499,5	320,4	2 110,9	1 075,9	912,1	845,5	5 807,1	1 329
,5	8,2	10,2	22,4	28,5	32,9	20,2	150,7	62,0	45,9	16,1	31,6	13
,1	569,0	217,4	1 055,0	1 221,7	631,3	433,4	6 990,4	3 891,8	1 712,5	541,4	1 811,9	2 064
,3	1 173,8	484,3	1 893,5	2 603,5	1 163,8	774,0	9 252,0	4 469,7	2 670,5	1 403,0	7 650,6	3 407
	–	–	–	–	–	–	–	–	–	–	–	–
,3	210,6	777,7	203,1	693,0	337,9	44,8	254,2	577,8	179,6	101,1	375,9	83
,2	1 384,4	1 262,0	2 096,6	3 296,5	1 501,7	818,8	9 506,2	5 047,0	2 850,1	1 504,1	8 026,5	3 490

Shoe, leather & fur industries	Food industry	Misc. domestic industries	Total socialist industry	Construction industry	Private construction	Private small-scale industry	Agriculture	Transportation	Commerce	Other productive
29	30	31	32	33	34	35	36	37	38	39
2,6	142,3	2,1	1 755,6	30,0	–	29,5	14,0	353,7	70,9	–
–	0,7	–	581,6	11,6	–	–	–	0,6	–	–
–	0,7	10,0	465,2	0,1	–	–	20,5	0,8	–	–
1,2	36,9	6,7	3 382,0	271,4	143,5	0,5	21,0	106,0	19,8	–
0,1	4,6	6,3	1 536,6	14,2	7,9	0,8	1,6	44,3	1,7	–
54,3	103,7	12,0	2 599,5	247,5	–	212,4	247,5	587,0	20,0	12
0,5	11,9	7,8	981,2	261,4	35,7	130,0	–	70,3	11,2	2
–	0,5	–	471,1	–	–	41,0	3,9	30,2	2,4	–
–	9,9	–	560,7	2,7	–	14,8	9,0	40,0	38,6	1
24,4	110,1	17,0	1 409,2	473,1	133,5	101,4	76,6	79,4	87,7	11
8,1	105,1	8,1	1 146,6	47,1	2,0	106,1	62,6	51,4	173,8	6
0,5	47,6	85,0	771,4	1 634,7	311,4	–	7,1	37,9	105,9	–
1,4	69,2	1,6	614,8	129,8	–	2,0	383,5	399,0	42,2	167
0,1	26,0	1,5	156,5	9,2	–	2,6	3,0	7,7	9,2	–
3,4	3,8	0,2	651,2	8,2	–	1,4	18,3	17,0	3,0	1
10,7	45,0	37,4	1 067,1	158,3	71,4	25,0	537,3	47,1	35,0	–
0,	74,7	0,6	307,4	–	–	0,1	46,4	0,3	1,0	–
34,	76,2	8,2	269,0	10,6	–	15,0	2,2	8,1	60,4	–
18,	17,9	31,3	1 080,9	8,7	–	11,5	7,3	4,2	1,8	1
38,	42,0	7,6	1 001,1	72,0	0,1	46,4	61,2	242,8	10,7	–
25,	83,5	60,4	976,8	652,7	182,6	230,9	13,9	77,0	105,9	16
35,	159,2	–	1 023,6	67,1	–	10,6	2,1	6,0	62,6	13
1	66,2	6,0	169,6	–	–	–	4,5	55,5	82,3	–
133,	12,1	400,5	4 482,3	7,1	–	191,4	0,3	2,0	34,5	1
9	0,4	128,9	2 824,1	0,2	–	379,4	–	5,2	8,8	1
49	29,1	32,3	1 168,9	9,8	–	94,6	74,7	10,2	39,4	–
693	8,6	25,6	887,0	4,1	–	217,0	12,3	3,5	4,8	–
74	22,8	6,0	450,1	78,9	–	0,1	22,8	203,1	42,6	1
39	22,3	–	104,6	27,2	–	0,1	5,0	61,2	4,0	–
1	5 677,3	2,0	6 727,4	17,4	–	–	819,3	31,8	66,5	–
5	61,0	65,5	271,3	7,0	30,0	31,0	14,4	5,5	123,6	–
1 262	7 071,3	971,2	89 823,5	4 322,5	918,4	1 896,5	2 486,2	2 589,7	1 270,0	242
3	–	8,0	150,9	–	–	–	–	–	30,8	–
–	–	–	–	–	30,0	–	144,9	–	4,1	–
–	–	–	3,9	–	89,0	–	418,2	–	14,3	–
26	11 471,6	3,2	13 835,0	21,2	–	151,9	20 898,9	43,0	316,4	–
6	512,7	60,0	1 761,5	922,3	140,1	10,7	60,2	127,1	1 401,3	–
17	882,3	7,6	1 157,6	161,3	273,9	450,0	60,8	61,0	93,9	18
11	17,7	–	247,2	293,1	–	–	62,0	24,3	1 524,0	–
1	370,9	869,4	2 864,6	294,0	267,6	235,9	71,0	5,5	204,1	–
1 829	20 306,5	1 919,4	59 344,2	6 014,4	1 728,0	2 745,0	24 211,2	2 850,6	4 948,4	250
13	222,4	13,1	3 630,9	327,8	6,0	15,0	1 282,0	1 920,7	283,0	100
2 064	7 853,2	1 441,4	47 789,9	4 560,0	1 546,0	3 540,0	38 538,8	5 313,9	12 206,7	1 808
3 407	28 382,1	3 373,9	110 765,0	10 902,2	3 280,0	6 300,0	64 032,0	10 085,2	17 438,1	2 159
–	–	–	–	–	–	–	–	–	–	–
83	1 561,7	18,0	11 952,2	–	–	–	3 501,1	12,1	–	–
3 490	29 943,8	3 391,9	122 717,2	10 902,2	3 280,0	6 300,0	67 623,1	10 097,3	17 438,1	2 159

domestic prices, turnover tax included, million forints

Other non-productive activities 39	Undivided portion 40	Total (32-40) 41	Consumption of population, government & social institutions 42	Investments & renewal 43	Inventory increase 44	Export 45	Total (42-45) 46	Total resources distributed (41=46) 47	
–	–	2 282,1	708,9	293,9	58,5	4,5	1 065,8	3 327,9	1
–	–	593,7	–	–	40,9	–	40,9	634,6	2
–	–	486,6	85,3	37,1	–	58,0	180,4	667,0	3
–	16,7	3 961,2	62,3	210,8	417,4	297,0	987,5	4 948,7	4
–	–	1 607,7	10,0	42,7	214,7	294,8	562,2	2 169,9	5
12,7	9,9	3 936,5	1 292,7	3 711,7	257,5	3 139,4	8 401,3	12 337,8	6
2,6	–	1 472,4	230,4	339,9	34,9	172,2	777,4	2 249,8	7
–	3,5	553,0	556,9	220,4	192,7	702,1	1 680,5	2 232,5	8
2,1	–	608,1	288,6	242,3	–	384,9	915,8	1 583,9	9
13,5	36,7	2 411,1	911,3	115,7	413,8	378,1	1 818,9	4 230,0	10
6,9	79,8	1 675,1	938,3	292,3	–	0,2	1 230,8	2 905,9	11
–	6,3	2 924,7	198,0	53,8	–	74,0	325,8	3 250,5	12
167,3	15,5	1 755,0	319,8	0,9	32,0	742,3	1 095,0	2 850,0	13
–	13,7	201,9	212,5	15,5	20,6	–	248,3	450,5	14
15	13,7	709,3	50,9	7,5	–	0,2	58,6	767,9	15
–	19,1	1 960,3	226,1	23,8	56,1	158,2	464,2	2 424,5	16
–	0,6	355,8	515,3	14,7	268,4	415,7	1 209,1	1 564,9	17
–	1,8	387,1	797,6	1,7	170,0	48,0	1 017,3	1 384,4	18
1,9	1,7	1 063,0	26,6	7,7	147,4	12,3	194,0	1 262,0	19
–	4,2	1 439,4	476,0	6,7	24,6	149,9	657,2	2 096,6	20
166	5,9	2 262,3	843,7	82,3	3,7	104,5	1 034,2	3 296,5	21
13,3	–	1 185,3	266,1	12,8	18,8	18,7	316,4	1 501,7	22
–	1,0	312,9	446,3	1,3	25,9	32,4	505,9	818,8	23
1,7	5,6	4 724,8	1 036,6	50,3	1 855,7	1 838,8	4 781,4	9 506,2	24
1,5	15,1	3 234,3	1 707,2	21,4	8,2	75,9	1 812,7	5 047,0	25
–	8,4	1 405,3	710,2	148,4	213,3	372,4	1 444,3	2 850,1	26
–	4,4	1 133,1	102,6	6,9	–	171,5	371,0	1 504,1	27
1,0	3,4	801,5	5 241,9	22,4	1 550,5	410,2	7 225,0	8 026,5	28
–	9,7	211,8	2 059,0	8,3	822,4	388,2	3 278,5	3 490,3	29
–	2,9	7 065,3	16 847,6	59,7	2 571,0	2 800,2	22 278,5	29 943,8	30
–	5,7	488,5	2 193,4	59,8	371,5	278,7	2 903,4	3 391,9	31
242,6	285,2	53 834,6	30 452,1	6 121,7	9 785,5	13 523,3	68 882,6	122 717,2	32
–	174,0	355,2	670,8	9 876,2	–	–	10 547,0	10 902,2	33
–	–	179,0	1 510,0	1 591,0	–	–	3 101,0	3 280,0	34
–	55,9	581,3	5 174,8	–	522,5	21,4	5 718,7	6 300,0	35
–	84,4	35 350,8	24 063,2	589,9	4 851,5	2 768,6	32 272,3	67 623,1	36
–	840,6	5 272,8	4 259,4	421,5	4,3	139,3	4 824,5	10 097,3	37
13,5	1 996,2	4 277,2	10 879,4	63,7	830,8	1 387,0	13 160,9	17 438,1	38
–	–	2 150,6	–	–	9,0	–	9,0	2 159,6	39
–	–	96,4	–	–	91,9	399,0	490,9	587,3	40
256,1	–	102 097,9	86 008,7	18 063,1	16 095,5	18 238,6	139 006,9	241 104,8	41
100,0	–	7 565,4	–	–	–	–	–	–	42
1 803,5	96,4	115 395,2	–	–	–	–	–	–	43
2 159,6	96,4	225 058,5	–	–	–	–	–	–	44
–	–	–	–	–	–	–	–	–	45
–	490,9	16 046,3	–	–	–	–	–	–	46
2 159,6	587,3	241 104,8	–	–	–	–	–	–	47

in the coming years will be more detailed than the 1957 Hungarian input-output table. The Hungarian table to be compiled for 1959 will contain more sectors than the one for 1957.

The number of sectors in the foreign and Hungarian tables does not give a complete picture of the extent of detail in their compilation. From our domestic experience we know that detailed breakdowns are available for certain sectors. (In the transportation sector, for example, separate data are available on railroad transportation, navigation, and motor transportation.) In the case of other sectors (for example, the construction materials industry) the organs entrusted with the compilation of the data found it necessary to prepare separate sub-matrices for the sectors in question. Naturally, the breakdowns of the individual sectors are not always sufficiently detailed to permit their inclusion in the input-output table. (In other words, the number of sectors in the input-output table could not always be increased, although in some cases this would have been feasible.) Thus, the information gained about the structural interrelations of the national economy is considerably more detailed than what the published input-output table would lead one to believe. But it must be admitted that in some cases the information not given in the input-output table is not sufficiently detailed and that the supplementary data of the subsectors are not always available in a breakdown for every line and column of the table.

The extent of detail of the Hungarian input-output table for 1957 is reflected in the comparatively great detail of the industrial sectors. Of the 47 sectors, 32 (68 percent) are industrial ones.[11] Of the 35 sectors in the 1957 Polish input-output table, 15 (43 percent) are industrial ones. In the 50-sector American input-output table for 1947 there are 29 industrial sectors (58 percent). The 32-sector Italian table for 1953 has 17 industrial sectors (53 percent). Of the 37 sectors in the 1955 Yugoslav table, 15 (45 percent) are industrial ones. With respect to the industrial sectors, therefore, the Hungarian input-output table is comparatively more detailed than the aforementioned ones. This fact has evident advantages which--in view of the important role of industry in the national economy--require no further explanation. The inclusion of the individual sectors of the national economy in theinput-output table should not be examined solely on the basis of the numerical ratios of the industrial and other sectors. It will be interesting to examine the factors

that have cuased the comparatively high ratios of the non-industrial sectors in the foreign input-output tables and to compare the absolute numbers of such sectors.

The comparatively higher ratios of the nonindustrial sectors in the input-output tables of certain capitalist countries is caused in part by the different interepretations of the scope of production. The Hungarian input-output table for 1957 does not include service sectors, such as banks, insurance companies, rents from real estate, etc.

Furthermore, foreign input-output tables usually divide agriculture and transportation into several sectors, whereas in the Hungarian table these account for one sector each. The 1950 Norwegian table, for example, contains four agricultural sectors (agriculture, forestry and hunting, fishing, whaling); the 1955 Italian table has three agricultural sectors (agriculture, forestry, and fishing and hunting); and the 1957 Polish and the 1955 Yugoslav tables each have two (agriculture and forestry).

The separate treatment of the individual branches of agriculture in the input-output tables mentioned above hinges on the relative importance of these branches in the national economies of the countries concerned. In Hungary, the various branches of agriculture (forestry, fishing, hunting) are of minor importance, but agriculture as a whole plays a very important role in the national economy. In the input-output table for 1959, therefore, agriculture will foreseeably be divided into three sectors (crop production, livestock production, and other branches).

In connection with transportation we wish to mention that in the American input-output table for 1947 it is divided into four separate sectors (railroad transportation, maritime shipping, other transportation, telecommunications). The Nowegian input-output table for 1950 has three transportation sections (shipping, transportation by land and aviation, telecommunications). Tentatively, the Hungarian input-output table for 1959 will have two transportation sectors (transportation, telecommunications).

A slight increase in the agricultural and transportation sectors will be useful in the study of their relations but will not increase the ratio of the nonindustrial sectors, because a further increase in the number of industrial sectors is also desirable.

The purpose of an input-output table is to reveal the structure of the national economy. In view of the fact that the input-output table of each country must reflect the specific economic structure, comparisons of the extent of detail of the various input-output tables should not be carried to the extreme. We should not hesitate to draw certain general conclusions from the comparisons (for example, it has been useful to compare the agricultural and transportation sectors), but we would profit very little from a detailed comparison of theindustrial sectors in the input-output tables of the various countries. In the course of our preliminary studies we undertook to make such comparisons--with special emphasis on the relations of the machine industry, because of its importance--but the results were unsatisfactory. Certain countries have achieved some success in their breakdown of the machine industry. In the United States, for example, the following branches of machine industry production are treated as separate sectors: 1) the production of agricultural, mining, and construction-industry machiner; 2) the production of machinery for metal cutting; 3) the production of other machinery (with the exception of electrical machinery); 4) the production of motors and generators; 5) automobile production; 6) the production of other means of transport; 7) the production of electrical machinery. In most countries, however (for example, in Poland, Norway, Italy, and Yugoslavia), machinery production is treated as a single sector, and in Norway and Italy it is merged into the metal processing sector. The detailed breakdown of machinery production in the United States would undoubtedly be a desirable solution. But theimportance, development, and degree of specialization of the sectors listed in detail in the American input-output table is considerably greater than that of comparable sectors in Hungary. Consequently, the separate treatment and compilation of these sectors in American has been comparatively easy. The Hungarian input-output table for 1959 will be based on the same breakdown of industry as in the Hungarian statistical system, giving a somewhat more detailed breakdown of machinery production. A study of comparable foreign experience, however, has failed to provide an answer for a suitable breakdown of the machine industry (and of industry in general). Thus, this problem will have to be solved with due consideration for the specific structure of the Hungarian national economy, on the basis of the available data and of the requirements which the Hungarian input-output table must meet.

Of the sectors included in the Hungarian input-output table for 1957, sector number 40 (the undivided portion) also merits some attention. In evaluating the amount of work spent on

the compilation of an input-output table, it is customary to consider also the total amount of the undivided portion. This is based on the assumption that the smaller this total the greater has been the effort to compute and break down the inputs and outputs.

In the Hungarian input-output table, the undivided portion amounts to 4 billion forints, or 1.9 percent of the available or distributed total resources. In the 1947 American input-output table, the ratio of the undivided portion is 3.2 percent; in the 1955 Yugoslav table it is 3.5 percent. Both ratios are comparatively higher than the ratio of the undivided portion in the Hungarian table for 1957. In the Norwegian input-output tables for 1948 and 1950, on the other hand, the ratios are lower (1.6 and 1.7 percent respectively) than in the Hungarian table.

The importance of the undivided portion, however, should not be judged merely on the basis of its over-all ratio in proportion to the total resources. Within the total undivided portion (it applies to the entire national economy), it is also necessary to examine the shares of the other sectors in the undivided portion. Accordingly, we compared the 1957 Hungarian, the 1947 American, the 1950 Norwegian and the 1955 Yugoslav tables in order to determine the number of sectors whose share in the undivided portion exceeded 2 percent of their own inputs and outputs.

Among the 47 sectors included in the Hungarian input-output table for 1957 there are only six (13 percent) whose share of the undivided input exceeds 2 percent of their own inputs. These six sectors are as follows: machinery production (4.5 percent), iron and metal mass-goods production (4.4 percent), miscellaneous and domestic industries (25.6 percent), the construction industry (2.7 percent), private construction (8.2 percent), and the private small-scale industry (3.7 percent). In the majority of the sectors the divided portions amount to billions, while in the shares of the undivided portion the range is a few million. The ratios of the undivided portions are expecially high in the miscellaneous and domestic industries and in private construction. This fact is closely connected with the character of these sectors, and a reduction of their ratios will not be easy even if the statistical methods are further improved. The high ratios of the undivided portion in these sectors naturally cause a considerable reduction in their inputs. Characteristic of the high ratio of the undivided portion in the

miscellaneous and domestic industries (25.6 percent) is the fact that in the compared American, Norwegian, and Yugoslav input-output tables there was not a single sector whose ratio of the undivided portion amounted to 25 percent. Despite the difficulties involved, efforts must be made in the 1959 Hungarian input-output table to break down this item of more than 800 million forints.

The fact that the bulk of the undivided portion is concentrated in a few sectors has evident advantages with respect to the input-output table as a whole. These advantages outweight the drawback of inaccuracy in the few sectors concerned. In the majority of the sectors, the ratios of the undivided inputs are very low, which in most cases cannot be said of the foreign input-output tables compared.

In the 50-sector American table for 1947, for example, there are 36 sectors (72 percent) in which the ratios of the undivided inputs exceed 2 percent, and there are 16 sectors in which these ratios exceed 10 percent (the lumber industry, furniture industry, chemical, rubber, and glass industries, five machine industry sectors, etc.). Among the 33 sectors of the Norwegian input-output table for 1950, there are 20 (61 percent) in which the ratios of the undivided inputs exceed 2 percent. In the 37-sector Yugoslav table the number of such sectors is 19 (51 percent).

The situation is similar with respect to the breakdown of the outputs. Among the 47 sectors in the Hungarian input-output table for 1957, there are only four (9 percent) in which the ratios of the undivided outputs exceed 2 percent of the total outputs. This means that the bulk of the undivided output ratios of more than 2 percent is 60 percent in the 1947 American table, 42 percent in the 1950 Norwegian table, and 37 percent in the 1955 Yugoslav table. In the Polish input-output table of 1957 the undivided output ratios are less than 5 percent in 12 sectors, from 5 to 10 percent in five sectors, and more than 10 percent in three sectors (electric power generation, the colored metals industry, and the construction materials industry).

Having analyzed and compared the data concerning the undivided portion, we may be satisfied with the results achieved in the compilation of Hungary's first input-output table, the one for 1957. The over-all data concerning the undivided portion do not reflect these results. In my opinion, however, it is objectionable that a Hungarian publication containing

the input-output table for 1957 contains no information on the methods used in treating the undivided portion. This would have been necessary in order to explain and justify the methods with which the total undivided portion was obtained. Incidentally, I believe that the correctness of these methods is disputable.

But it would be a mistake to exaggerate the importance of the size of the total undivided portion. The accuracy and usefulness of the input-output table depends on many factors, among which the size of the undivided portion--although not insignificant--cannot be termed the most important ones. It is not a waste of time to establish the results achieved and to compare them on an international basis. But to attribute too much importance to these characteristics would be a mistake too, because it might prompt the compilers to give a breakdown of the undivided portion at all costs.

The actual significance of the undivided inputs and outputs lies in that they distort the picture of the structural interrelations of the national economy. In addition to the size of the undivided portion, however, the completeness of this picture also depends on the extent to which the data concerning the structural interrelations are detailed. It may very well happen that some inputs and outputs are not included in the undivided portion but in other (perhaps related) sectors than where they actually belong. This can happen especially if the statistical methods used are not sufficiently refined. Such phenomena may be widespread when the basic statistical data are lacking, a fairly common occurrence in the capitalist countries.

One of the strong points of the Hungarian input-output table is the comparatively low ratio of the inputs and outputs assigned to sectors other than where they belong. In this respect, however, the regrettable absence of foreign data does not permit a comparison of the Hungarian input-output table with the tables published abroad.

Owing to the complexity of economic life, cases in which no relation exists between two sectors are rare. The extent to which the national economies are developed, the structures of the national economies, and the degree of specialization and cooperation may justify certain differences among the various foreign countries. A study of the foreign input-output tables, however, permits us to assume that the empty squares in them can be attributed primarily to the absence of

basic data and to the shortcomings of the methods employed, rather than to the specific characteristics of the national economies in question.

In the American input-output table for 1947, 747 (30 percent) of the 2,500 squares are empty. In the Norwegian table for 1950 the ratio of empty squares is even higher--563 (50 percent) out of 1,122. In the 1953 Italian table, the ratio of empty squares is 36 percent (379 out of a total of 1,056). In the 1955 Yugoslav table, this ratio is 33 percent (431 empty squares out of a total of 1,320). In comparison to these tables, the ratio of empty squares in the Hungarian input-output table for 1957 is by far the lowest--354 empty squares (16 percent) out of a total of 2,173.

The comparatively large number of filled squares in the Hungarian input-output table can probably be attributed to the favorable conditions for collecting statistical data under socialism. The differences in the structures of the national economies, etc. cannot be such as to warrant interrelations among 84 percent of the sectors in Hungary, in contrast to 70 percent in the United States, 50 percent in Norway, 64 percent in Italy, and 67 percent in Yugoslavia.

IV

Of outstanding importance among the sectors included in the input-output table is the import sector. In the following, therefore, we wish to discuss in somewhat greater detail the methodical problems of handling this sector.

In view of the significant role which import plays in the Hungarian national economy, there has been considerable controversy over how to reflect the imported products in the input-output table. Depending on the methods selected for handling the imports, the economic content of the input-output tables can vary considerably. We wish to mention in advance that under the influence of the debates the Central Bureau of Statistics has decided to compile several versions of the input-output table for 1957. In each of these versions the import is treated in a different manner. In order to illustrate the problems involved, we wish in the following to compare the first Hungarian version[12] (hereinafter version A) with the individual foreign input-output tables.

But first let us examine the basic principles of versions A, B, and C and their relative merits and disadvantages.

A. The use of version A is justified in that the input-output table gives a complete picture of the origin and use of all material means available to the national economy. These means may be either domestic means or imports. The amount of these imports is shown in the import line of the column of the sector which produces such (or similar) products. The quantity imported increases the amount of means available from domestic sources. In other words, we let the imports "run through" the domestic productive sectors (for example, imports of textiles are added to the output of the textile industry; imported sulphuric acid is included in the output of the chemical industry, etc.) from which the imports are distributed among the other sectors of the national economy.

B. The B version was used in the 1947 American and the 1948 British input-output tables. The application of this version is justified in that it is theoretically proper and practically useful to handle foreign trade in the same manner as production sidelines are handled. Like statistics in general, the input-output tables are based on data supplied by the enterprises (or by their establishments). The enterprises (or their establishments) may produce certain sidelines. In the compilation of the input-output tables it is customary to transfer the sidelines to the sectors to which they would otherwise belong. Accordingly, the individual sectors get a certain product from only one sector, whose principal production includes the product in question.

Similarly, imports can also be divided into two categories:

a) competitive (products also manufactured at home), and
b) noncompetitive (products not manufactured at home).

The B version treats the competitive import in the same manner as the sidelines are handled. In other words, the input-output table does not show the competitive imports in the categories that consume them. Such imports are "run through" the domestic sector which produces similar products. This sector in turn distributes the competitive imports among the consumer sectors. The noncompetitive imports, however, are shown in the consumer sectors.

The basic principle here is that the sectors get one product from one sector, regardless of whether the product is domestic or foreign, a principal product or a sideline.

C. In the C version (for exsmple, in the 1939 American and in one of the 1935 British tables) all imports are included in the sectors that actually consume them. Here the aim is to reflect the structural relations in the actual form in which they occur.

Another version is also feasible (let us call it the D version), in which all inputs are broken down into two categories, one the domestic input, the other the imported input. We shall return to this version later on.

Naturally, to gain a complete picture of the individual versions it is not enough to know only the principles on which they are based. What we must know most of all is how the different versions affect the economic interpretation of the input-output tables.

1. The A version gives a clear and unambiguous picture of the import structure. We know that the import line of each sector shows the exact amount of the imports that correspond to the principal products of the sector in question (including the sidelines of other sectors as well). We also see the ratio of imports in proportion to domestic production.

The A version also gives a clear picture of the structure of material consumption. Here the consumption of a certain material in the various sectors of the national economy can be read on one and the same line. For example, the coal consumption of the textile industry can be found in one place (in the "coal mining" line, under the "textile industry" column) and not in two places (as before, and also in the "import" line of the same column). Thus, the A version ensures the uniformity of the individual lines (with respect to material consumption and imports as well). Consequently, the technical coefficients computed on the basis of such an input-output table are really technical. For any given technological process, it is entirely irrelevant whether the inputs consumed are of domestic or foreign origin.

What are the shortcomings of the A version? It fails to give a true and accurate picture of the structure of the national economy and of its production relations, because no distinction is made between the domestic or foreign origin of

the materials consumed. It also shows accrued structural relations (contains so-called transfers) because, for example, the relations between the textile industry were getting not only domestic but import coal as well; naturally, this affects the value of the technical coefficients computed on this basis. In other words, the A version distorts the evident structural relations. Actually the import coal may realistically cover not the relations between coal mining and the textile industry but the invisible relation between the textile industry and the machine industry, because for the imported coal we may export, for example, machinery.

2. The C version represents the opposite extreme. Here all imports are listed under the actual consumers. The advantage of this solution lies in that it, unlike the A version, gives a more accurate picture of the domestic structural relations of the national economy. This input-output table shows only the actual structural relations, without the so-called transfers as in version A. Another advantage is that imports in foreign trade do not always indicate inevitable structural relations in the national economy. Imports can be curbed, as they often are. In such cases, a thorough knowledge of the structure of the national economy is needed to estimate the chain reaction caused by the necessary changes.

In the C version, on the other hand, the "import" lines become heterogeneous. In the "import" line of the "textile industry" column, for example, all types of imports consumed by the textile industry will be represented in one total. This favorable in that we can obtain a clear-cut picture of the total import requirement of each sector. We cannot say, however, that the picture presented in such an input-output table is a true and accurate one--the material consumption of the individual sectors is incomplete because only their consumption of domestic materials is reflected, while the imported materials are listed together with the imported products in one item. For the production process of a consumer sector, however, it is necessary to know its total consumption (including both the domestic and the imported materials), because in the technical indices of the sector both kinds of consumption are represented without distinction. Thus, it can be said that the A version partially reflects "construed structural functions," while the separate handling of the imports in the C version partially results in a "construed material consumption structure."

3. The B version occupies an intermediate position between versions A and C. (This version has been adopted in the more recent input-output tables published in the United States and Britain.) Owing to the different handling of the competitive and the noncompetitive imports, here the structural relations and the technical coefficients are also of an intermediate character.

With respect to the noncompetitive imports, the advantages and drawbacks of version B are similar to those of version C. With respect to the competitive imports, on the other hand, the advantages and drawbacks are close to those of version A. In general, however, version B combines the advantages rather than the disadvantages of the other two versions. Here again we find the advantageous characteristic of version A--that a certain kind of input can originate from only one source. (A product is either noncompetitive and originates from import, or it is competitive and originates from the domestic producer.) In principle, therefore, no input can originate from two sources (as in version C).

This system is actually based on the assumption that the noncompetitive imports are indispensable because similar domestic production is lacking. This is partially true but partially misleading. In the absence of domestic production it is nevertheless more realistic to show that an imported product originates from import than to assume that it originates from a domestic sector which does not produce the production in question at all. (To show, for example, that imported cork in Hungary is supplied by her agriculture.)

Furthermore, version B is also realistic because the input-output table shows the actual consumption of materials. (The competitive imports of materials are reflected together with the domestic materials.) The noncompetitive imports, on the other hand, are reflected in the sector from which they actually originate--foreign trade.

In the B version, the import line is heterogeneous. About the import (or rather about the relation of the import line to the output of a given sector) we can say that to a certain extent it combines the negative traits of versions A and C. For example, the import line of the textile industry does not show only the products manufactured in that industry (as in version A) or only the products used exclusively in textile industry production (as in version C). The values

in the import line include both the competitive and noncompetitive imports. In the case of the textile industry, for example, the import line includes imports of cloth which are competitive with respect to the national economy as a whole and which are "run through" the textile industry. But it also includes noncompetitive imports of cotton which are not "run through" the agricultural sector but are listed under the textile industry, the direct consumer. In principle, therefore, version B presents a clearcut construction in that a certain type of input can originage only from one source. But the import line in version B is heterogeneous.

In connection with the various versions, Leontief[13] points out that in the compilation of most input-output tables it is necessary for practical reasons to resort to the somewhat unlikely assumption that all domestic consumers are using the competitive import and the corresponding domestic product in the same manner (i.e., in accordance with the national ratios of the domestic production and of the import). In connection with this statement, he mentions that one advantage of version C is its greater flexibility. In practice, the import ratios vary according to sector, and version C shows the actual import ratios.

Sandee[14] points out that the competitive import corresponds to the difference between domestic demand and domestic production. Changes in the demand often affect the import. In other words, changes in the domestic demand will not alter the domestic production but will affect the import volume. This can be remedied if the input-output table handles the competitive import separately. Sandee also points out that the distinction between competitive and noncompetitive imports must be handled with caution. Let us suppose, for example, that coal is a competitive import. The quality of coal, however, differs considerably, and the term can be applied to entirely different products. Similarly, the character of flour may vary considerably from April to September. It would not make much sense to consider the flour imported in April as a competitive import, because domestic flour may have run out and may be available again only in September.

Reviewing the compilation of the Norwegian input-output table, Sevaldson[15] points out that foreign trade is of considerable importance to Norway. He writes in part: "The import ratios in the Norwegian input-output table have the same basic importance as the stable coefficients of the domestic structure." He also emphasizes: "For every sector,

every level of activity, we must have an estimate on what ratio of the demand can be supplied from domestic production."

* * *

In addition to versions A, B, and C discussed above, other versions are also feasible. We have no information on foreign experience with other versions. In the course of the preparations for the 1957 Hungarian input-output table, it was also proposed to break down each item into two parts, showing separately the domestic and the foreign inputs. Let us call this solution version D.

In version D the consumption of imports is shown in the consumer sectors, and the imports are not "run through" the corresponding domestic sectors. Thus, the table does not show construed transfers. This version makes it possible to compute separate technical coefficients for the structural relations that do not include the imports, and separate ones for the structural relations that include them. If the data are available in the breakdown required for version D, input-output tables can also be compiled for versions A, B, and C.

In addition to the first (A) version of the Hungarian input-output table for 1957, the Central Bureau of Statistics also compiled two other tables that correspond to versions C and D. The second and third tables were completed later than the first version, and it would not have been practical to hold up publication of the report until the other two tables were ready. Thus, the Hungarian publication contains only the input-output table that corresponds to version A. The tables compiled in accordance with versions C and D will be published in the near future, as supplements to the first table.

To the best of my knowledge, no other foreign country has analyzed its import relations in such great detail as the Hungarian input-output tables. It is possible that on the basis of our experience with the input-output tables for 1957 we will select the version that proves the most suitable and will compile only this one version in the future. For the time being--until the practical experience with the tables is evaluated--version D seems to me the most promising one of the three. It can ensure the same degree of statistical accuracy as version A. Naturally, in evaluating the individual versions we must not only consider their economic characteristics

but must also examine whether a sufficient degree of accuracy can be achieved under the given conditions.

V

In conclusion, I would like to dwell briefly on three problems: the fundamental differences between the Hungarian input-output table and the comparable tables compiled in capitalist countries, the relations between the input-output table and the present balance system of the national economy, and the tasks which we must solve.

The fundamental differences between the input-output tables compiled in Hungary (or in the socialist countries in general) and the similar tables compiled in the capitalist countries stem from the differences in socialist and capitalist production conditions, and from the different possibilities and functions of socialist statistics. In the capitalist countries the enterprises often obstruct the detailed study of structural relations. They refuse to give detailed information on the composition of their inputs or production because they regard such data as trade secrets. Consequently, in certain countries the statisticians have only crude estimates of the accumulations. If a sector of the national economy consists of only one or two enterprises, this sector cannot be included separately in the input-output table because the data of an enterprise would be made public or would fall into the hands of the competition. Owing to these reasons and to other difficulties in the collecting of data, the compilation of input-output tables in capitalist countries must be based on often uncertain methods of estimation. There is also a fundamental difference in the utilization of the input-output tables. In the capitalist countries the purpose of the input-output tables is the same as in socialist countries--to use the data obtained for controlling the national economy. Although in the past decade government control of the national economy in the capitalist countries has increased considerably, it cannot exceed the limits imposed by the existing conditions of ownership. Thus, this also limits the extent to which the input-output tables can be utilized in the capitalist countries. It may be interesting to recall the fate of the input-output studies undertaken in the United States. As we well know, the input-output studies directed by Leontief formed a part of the Democratic Party's program for national economic

planning. When the Republican Party came into power in 1952, the allotments for input-output studies were cut, primarily because influential circles within the Republican Party branded these methods as "radicalism" and an infringement of "free enterprise." The fact that with respect to the compilation and utilization of the input-output tables the situation is entirely different in the socialist countries requires no further explanation.

It may be useful to point out that the input-output tables should not be regarded as substitutes or replacements for the present system of preparing the balance of the national economy. The purpose of the input-output tables can be only to supplement the balances of the national economy where the latter fail to give sufficiently detailed information--information on the structure and structural relations of the national economy.

In connection with our coming tasks it is necessary to emphasize that the compilation of the Hungarian input-output table for 1957 has been only the first step in the study of the detailed structural relations of the national economy. This first step is of great significance but should not obscure the fact that our coming tasks and the problems awaiting solution are highly complex.

One such problem concerns the prices on which the input-output table is based. The 1957 input-output table is based on the 1957 current prices, which since then have become obsolete, primarily through the revision of the producer prices in January 1959. This necessitates the modification of the 1957 input-output table, with the aid of price indices. In this manner we will obtain estimates of the 1957 structural relations, expressed in 1959 prices. The question of the prices to be used in this modification is also important from the point of view of the input-output table for 1959. A comparison of the modified table for 1957 and of the one to be compiled for 1959 will show, among other things, what effects are produced by the same products in the various relations but at different prices.

The question of prices, however, is only one of the problems that require close study in the coming years, in order to develop the most suitable principles for compiling the input-output tables of the Hungarian national economy. The problems of this kind are numerous. It is essential to clarify, for example, whether our assumptions concerning the stability of the technical coefficients are sound under our eco-

nomic conditions, whether the increases of the inputs in the various sectors will confirm the supposed linearity, etc. The experience in the practical application of the input-output table must be thoroughly studied from the point of view of developing the most suitable matrix form, etc. Thus, a very wide range of tasks must be solved, for which the input-output table for 1957 serves as a promising start.

Footnotes

1Statisztikai Szemle, No 2, 1958, pp 139-146.

2Az agazati kapcsolatok merlege 1957 [The 1957 Input-Output Table], Central Bureau of Statistics, Budapest, 1959, p 56.

3See Zoltan Kenessey: "The 1923-1924 Balance of the Soviet People's Economy," Statisztikai Szemle, No 4, 1958, pp 315-322.

4Andras Brody: Az ipar agazati termekmerlegei [The Input-Output Tables of Industry], Hungarian Academy of Sciences Institute of Economics (MTA Kozgazdasagtudomany Intezete), a preliminary report.

5W. W. Leontief: "Quantitative Input-Output Relations in the Economic System of the United States," Review of Economic Statistics, August 1936.

6W. D. Evans, M. Hoffenberg: "The Inter-Industry Relations Study for 1947," The Review of Economics and Statistics, May 1952.

7As yet we have not received this book.

8Nasjonalregnskap 1930-39 og 1946-1951, Norges Offisielle Statistik, XI, 109, Oslo , 1952.

9Nasjonalregnskap 1938 og 1948-1953, Norges Offisielle Statistikk, XI, 185, Oslo, 1954.

10E. Krzeczkowska, B. Szybisz, L. Zienkowski: "Input-Output Table of the Polish National Economy," (Tablice przeplywow miedzydzialowych i miedzygaleziowych w gospodarce narodowej Polski), Ekonomista, No 3, 1959, pp 553-559.

[11] In giving the number of sectors, it is necessary to take into consideration that in the input-output tables there are also "total" sectors. In the 1957 Hungarian input-output table such sectors are Nos 32 (Total socialist industry), 41 (Total), 44 (Production), and 47 (Total resources). The 1953 Italian input-output table has three "total" sectors our of 32; the 1955 Yugoslav table has three out of 37. Thus, if the "total" sectors are disregarded, the ratio of industrial sectors is even higher--32 out of 43.

[12] This version appears in the publication listed in footnote number 2.

[13] W. W. Leontif: The Structure of the American Economy 1919-1939, pp 164-165.

[14] The Structural Interdependence of the Economy, John Wiley & Sons, New York. A Giuffre--editor, Milan.

[15] Per Sevaldson: "National Experiences, Norway," The Structural Interdependence of the Economy, John Wiley & Sons, New York. A. Giuffre--editor, Milan, p 305.

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HUNGARY

Current and Long-Range Problems of Thermal Engineering Research

[This is a translation of an article by Bela Bator, Assistant Director, Institute of Thermal Engineering Research (Hotechnikai Kutato Intezet), in Energia es Atomtechnika, Vol XII, No 9, October 1959, Budapest, pages 508-515; CSO: 3450-N]

In this lecture I should like to present the current research problems and long-range plans of the past ten years based on the experience of the Institute of Thermal Engineering Research.

As an introduction, it is necessary to outline the power situation in the year that the institute was established and its development today.

In 1949, when the primary task was to organize a socialist industry, the introduction of the planned economy system made it necessary to establish certain research institutes in the basic industries.

The program of our institute is to conduct research in the various industrial branches producing or consuming thermal power, to devise new technologies and apparatuses, and to contribute to the theory of thermal processes. Owing to the very wide field of interest, this research program could only be carried out by systematic, step-by-step working methods.

1. Technical Problems

The first projects were determined by the direct needs of the industry. The great industrial boom predicted for 1949 and the corresponding power supplies specifically set the course of development. The Hungarian economy was built primarily on domestic energy sources. Obviously, our first aim was to work out methods of utilizing these energy sources, primarily coal. Parallel with this, it also became necessary to reduce the amount of imported power, primarily the import

of energy carriers, to the minimum. The efficiency of energy transformation and utilization also had to be increased. All in all, our first project was to establish the basic research in the above-mentioned fields as an aid to the newly organized Hungarian industrial energetics.

With the aid of figures, we can check on the correctness of our prediction. In the years indicated below the development of the coal mining industry was as follows:

Year	1938	1949	1958
Coal production (tons)	9.3 x 10^6	11.85 x 10^6	24.2 x 10^6
Percent	100	126	260 (204)
Average caloric value (kilocalories per kilogram)	over 5,000	3,953	3,350

During approximately 10 years, the average caloricity losses were 600 kilocalories per kilogram; however, for a 20-year period the loss was more than 1,700 kilocalories per kilogram.

The monthly produced coal types were the following (in 1,000 tons):

Year	Bituminous coal	Brown coal	Lignite
1938	87	646	47
1949	115	810	61
Percent	132	126	130
1958	219	1,481	320
Percent	252	239	680
Percent (1949 = 100)	190	183.2	525

From the above figures it is clear the since 1949 the quantity of the coal produced increased by more than 100 percent, while the caloricity diminished by 600 kilocalories per kilogram. Since the increase occurred mainly in producing poor lignites representing the coal type used for power purposes, and the majority of our steam boilers are more than 20 years old, the actual situation is even worse than the above table indicates.

If we were to investigate the cause of the quality deterioration, we would see that the caloricity reduction could be explained by the disproportionate lignite production alone, alone, even if we considered the decreasing lignite quality.

The real reason for the calоricity reduction and quality deterioration is the considerable increase in the ash content. Another contributing factor is the increase in the coal dust content owing to poor grading, which causes a serious problem in grate-equipped stoking installations.

In our research program the first step was to overcome the problem of ash increase, the second to eliminate the dust content, and the third to solve the problem of the moisture content.

In another lecgure I have already discussed our work in coal drying. Our achievements in this respect have primarily helped in the stoking of lignites; in recent years the performance of the coal dryers could be described as satisfactory.

The increase in the ash content presented a problem primarily for grated furnaces, because most of our presently used steam-boilers were originally built for considerably better coals. Among the 4,500 registered steam-boilers--not counting those using coal dust, oil, gas, wood, and industrial wastes--more than 4,000 are still of the grated type where the ash problem is an everyday one.

In order to decide on the necessary preventive measures, let us investigate the effect of the ashes on grated stoking installations. Since an increasing ash content causes the calоricity to decrease, more fuel has to burned to attain the same amount of heat. Hence the layer thickness must also be increased because of the larger fuel quantities involved, which in turn would increase the layer resistance and impair the de-scorification and burnout. Any increase in the ash content per 1,000 kilocalories increases the layer resistance and the moisture content, which impairs the ignition properties. In addition to those mentioned, the increase in the coal dust content will also increase the layer resistance, make the grate load uneven, and intensify the unfavorable effects of fly ash.

In stoking installations using coal dust fueling, these problems were easy to solve because most of these steam boilers, having been built in the past 15 to 20 years, assume a poor fuel quality. Here the problems stemmed from overloading the crushing mills by an increasing coal input. Owing to ash increases, fly ashes have also considerably increased, increasing deposits and erosions within the boilers; the dust exhausters have been overloaded, thus shortening the lifespan of the fans and causing ignition trouble in the furnaces.

To cure the above described defects, we have systematically worked out a series of remedies by which almost all types of boilers can be adaptable to practically any kind of brown coal. We have given a full account of our findings in many previous instances in discussing special furnace formations, various spread-firing methods, auxiliary coal dust stoking, HK [not identified] mixed fueling, etc.

Our present problem is to cope with the extremities involved in stoking our very youngest and very oldest coal types. In the first group belong the surface-mined lignites--particularly those of Gyongyos. In the second group we may classify the bituminous black stone coals of the Pecs-Komlo area.

The total estimated coal count in the Gyongyos area is about 160 million tons. According to the latest prospecting data, about 40 million tons are adaptable for surface mining. As can be seen from these figures, the energy utilization of this fuel is of vital importance. This coal type, expected to yield about 7,000 tons daily for the next five to eight years, constitutes an equivalent of 1,400 to 1,500 kilocalories per kilogram, assuming 25 to 30 percent ash and 40 to 45 percent moisture content. Naturally, the mine also yields better and larger grain sizes. However, in energy utilization we have to count on the poorest available quality. The stoking, crushing, and transport of the Gyongyos lignite is still in the planning stage.

With the close collaboration of other research institutes we have started to work out a method of eliminating at least one of the unfavorable ballast products, the ash and the moisture. We have conducted stoking experiments in factories and have taken suggestions from inside and outside personnel.

Starting from the fact that the individual fractions of the lignite's natural pulverization have different caloric values, we can easily determine the middleman formations. The finest fraction, call primary dust, has the highest ash content and thus the lowest caloric value. The first logical step was to isolate the dust and give up using it for power. However, this is not permissible from the economic viewpoint; on the other hand, it would not offer a complete solution. Washing, as one of the major coal-purifying processes, is out of the question; drying was also ruled out because the transportation of purified lignite at the grading state has not proved to be economical. Although we have examined the possibilities in

central coal drying in the power plant, the complication of the procedure, the general storing problem, and the relatively great investment involved have led us to exclude this method too. Finally, we arrived at the solution by which raw lignite is prepared directly before the stoking stage.

With the aid of our previous experiences, we investigated the grading process preceding the boilers. Our original plan was to separate the pre-crushed lignite into two parts with a pneumatic grader; the part with larger grains was to be applied directly to the main burners, while the finer fraction was to be fed to the furnace through the secondary burners. Extensive stoking experiments have proved that ignition problems were still present at the coal dust burners. This proves that to secure a stable flame, further preparations are necessary.

As far as the moisture was concerned, our plan was to feed the previously dried and crushed coal dust through low-efficiency cyclones; the existing material would be fde to the main burners, while the fine powder would transit the secondary burners before getting to the furnace. We also investigated the possibilities in open- and closed-cycle coal dressing. In our experimental burners these stoking experiments have yielded favorable results in obtaining a stable flame. We were greatly helped by the suggestion of the EROTERV [not identified] concerning the application of the vaporizing elbow.

This low-resistance elbow is capable of separating the pulverized materials if it is inserted into the conduit between the coal grinder and the coal dust burners. This way, only 20 percent of the coal dust was wasted. In this semi-open cycle dressing system, assuming an efficiency of 95 percent, the actual loss would only be one percent. The results obtained on a small-scale production basis have entirely fulfilled our expectations. Our task is now to work out the individual machines and installations; here we also count on the cooperation of other research institutes.

The stoking of the intermediate products of the Pecs-Komlo bituminous coals constitutes another problem. Furthermore, the fly ash and cinder combustibility should also be investigated in boilers using this type of coal. I must mention that a solution has already been found in the new power plant being built in Pecs-Ujhegy. However, it is necessary to deal further with this question, because the stoking

of bituminous coals having a low volatile material content constitutes a world-wide problem; the fly ash and cinder content runs relatively high even under optimal circumstances. Our results have recently been confirmed by reports from the Soviet Union and Bulgaria. First we resorted to the first logical method--the so-called supporting flame, by which we were able to reduce the capacity fluctuations, thus making the boiler operation more flexible. However, the combustible material content of the fly ash and cinder still remained at its original high level. Therefore, we have again reviewed all possibilities.

Generally, inadequate burnout is caused by the high combustible material content of fly ash and cinder. First the question of raising the furnace temperature should be considered to approximate the ideal conditions. We have planned to install an extra ignition zone on one of our 50-ton boilers, by which the furnace temperature could be regulated. In that, however, we were hindered by the low tacking point of the ash derived from Pecs-Komlo coals. In another process, suggested by Laszlo Benedek, a vibrating table would be used for preliminary grading to reduce the ash content. Although the experiments have shown favorable results, the large-scale application is still very far off. We have other ideas as well, mainly for reducing the ash content; a crushing system complemented with a new selective method seems to be the most promising solution, similar to the semi-open cycle method used for the Gyongyos lignite; however, in this case it would serve for reducing the ash content rather than the moisture content.

At this point we have to mention the problem of the slag-melting boilers. Many years of preliminary work lies in the analysis of our slag cakes. In most of our coals having a high ash content (the so-called long slag), the temperature difference between the tacking and liquid phases can be hundreds of degrees centigrade. If we realize that we have many million tons of coal that cause problems if burned otherwise but adaptable to the slag-metting process, it would make sense to carry out large-scale experiments finally leading to a practical slag-melting boiler construction, regardless of t the cost. With the collaboration of the ERKI [Power Plant Researvh Institute], we are preparing a plan for a vertical cyclone stoking system adaptable to a 50-ton boiler.

I have to make a brief remark about our preparations to cope with the expected increase in the utilization of oils in

future burners. This topic offers a great advancement in stoking technology, particularly through the application of the Peredi-type oil-gas burner. We also have other projects currently developed in this field.

Among our various enterprises I should like to point out the achievements in chemical water analyses. We have emphasized the necessity of degassing and desalinizing the feedwater in the water supplies of heavy-duty boilers. Although there are many straightforward methods for desalinization, we can suggest only a few good degassing processes. The physical process of degassing is currently being investigated. Adding up our domestic experiences and the published results of foreign experss, we can state that the two-stage degassing process offers a complete and perfect solution to this problem For instance, Dr Tietz has scientifically proved the basic necessity of two-stage degassing techniques. In this process the feedwater, after entering the degassing unit, is rapidly heated to the boiling point by being dispersed to very small drops. After accumulating the drops at the bottom of the unit, steam is bubbled through the liquid column. The question of the rate of degassing in the individual stages should arise. According to the related theory, the degassing cannot be perfect even under optimal circumstances because of the surface tension of small drops. By bubbling the steam through the system in the second stage, the remnant oxygen diffuses from the boiling water; thus the oxygen content can be reduced to almost zero. After examining the individual stages and comparing the collected experimental data, we can state that it is possible to achieve satisfactory degassing by establishing a constant steam pressure and an appropriate heat transfer in our presently used degassing chambers. The question is whether the second stage has any other role besides stripping the remnant oxygen.

Since the used steam is unregulated in most of our power plants, the degassing units employing the dripping method are subject to small but continuous steam pressure fluctuations. This, however small, tends to instantly heat up the circulating dripping water in the degassing unit; owing to thermal inertia, the degassing unit, together with the large amount of water, cannot follow the pressure fluctuation even for short periods, as far as the boiling is concerned. It is obvious that the second stage has primarily an equalizing effect. The remnant oxygen can be more easily stripped by the steam bubbling flushing method, since larger quantities of feedwater can stay in the system for a longer period of time. This large

quantity of boiling water also acts as a heat storage, thereby equalizing the pressure fluctuations. As can be seen, the second stage works in a twofold manner and it cannot be replaced even by a well-designed regulator because of the inevitable thermal inertia involved. Our presently conducted experiments will provide a basis for justifying these statements numerically.

II. Economic Evaluation of the Research

It is very timely nowadays to raise the question of economy, It should be asked whether the great cost of maintaining several research institutes could be justified or their value expressed in forints. Even if we could give a positive answer to this question, an actual evaluation in forints would not always be unequivocal.

We can choose between the following possible methods of economic evaluation:

First, we could evaluate the energy savings in terms of energy carriers. For instance, investment savings or import savings can be considered here. All cases could be included in this group wherever savings can easily be expressed in forints.

A more difficult problem is the appraisal of conceptual values. For instance, no numerical estimation can be given in evaluating in human, animal, or plant life.

In the third group we encounter the new processes and methods which enhance the operational safety or offer temporary production increases. In most cases it is not possible to give an accurate estimation of the value of these factors.

Another important condition is now soon and to what extent the successful experimental results are utilized in industry. The introduction of new processes always demands a certain investment which must be accounted for. The amortization factor cannot be ignored either; it is important how soon would the savings be visible. In our ten years of experience we cannot say that we have always evaluated the savings by the same rates. The new price sheets have helped a great deal in persuading and sometimes forcing the management to accept a new energy-saving idea and introduce it into practice.

In evaluating our own work, I shall confine myself to the easiest cases; however, I shall mention some of our attempts whose value may be disputable but still point out the deterioration of certain material values heretofore not calculated in forints.

In evaluating our achievements in the field of stoking techniques, first we shall examine the HK mixed-fuel process. It is still debated whether mixed fueling should be considered a new stoking method or just a substitute for the grading process. In our opinion, this question has already been settled. It is obvious that--independently from the grading problem--we have a process here which can stand up regardless of the coal quality used. The ideal solution is to supply all grated boilers with dust-free culms, although this meets certain practical obstacles.

Considering the natural pulverization, we do not have enough screened culms; if however, we must crush the larger grains to get smaller ones, there is the problem of using up the thus created surplus coal dust. Even assuming that we have an inexhaustibel amount of dust-free culms and the remnant coal dust could be utilized in all available quantities, the question remains: what will happen to the easily pulverizing Hungarian coals? By the present storing methods, the ideal dust content of 6 to 8 percent has increased to 40 to 50 percent during the three to six months of summer storing. Even more careful storing processes can substantially increase the dust content, not to mention the presently employed ramming method, which makes virtually impossible to burn the latter, stored coals in grate boilers with good efficiency. In the course of grading, the de-dusting also becomes questionable during the winter, when congealing or excessive moisture absorption can take place.

On the basis of the aforementioned facts, we have developed the mixed fueling process in grate boilers ranging from 5 tons per hour to 60 tons per hour capacity. The outstanding example of the Power Plant of Budapest (Budapesti Eromu) shows that by means of operating an auxiliary boiler by the HK mixed-fueling system it was possible to save 2,800 tons per month of high-quality coal or replace the same amount with other lower grade coals. In spite of rising maintenance costs, 3 million forints were actually saved in operational expenses in terms of new coal prices, However, the output capacity of this given installation could not be further increased because it was already working at its optimal capacity.

In other industrial plants, six additional HK boilers have already been installed while 27 units are in the planning stage. In those units already working, the achieved savings amounted to about 4.5 million forints, thanks to better stoking efficiency, increased output capacity, and other favorable factors. Altogether, about 10 million forints could be saved annually by merely adopting the HK process.

An important but not major possibility is to convert flue boilers to the coal dust fueling. In the already installed 14 boilers the so-called HK-CW stoking method saved a modestly calculated 2.5 million forints.

I have previously mentioned that we recently started to work on oil-fueling projects. For instance, the Lorinci Rolling Mill (Lorinci Hengermu) has shown a marked advancement in this field with estimated savings of half a million forinst in effective energy consumption and about 6 to 8 million forints in production costs after the conversion to oil-fueling was completed.

Similar large amounts can be saved in the clinker furnaces and in the calcining rotary furnzces of aluminum oxide factories, although we do not yet have numerical data on the actual amounts involved. However, approximate calculations show that the expected total annual savings can be about 20 million forints by developing the most favorable stoking techniques, a better and more flexible control of the technological process, and relatively small investments. Owing to delays in the accomplishment, we can take one-fourth of this amount as actual savings--namely, 5 million forints annually. I should like to cite here another very significant example of the effectiveness of our research in solving the problem of power shortages. In the Power Plant of Budapest during 1952-1953, our intermittently operated auxiliary coal dust-fueled furnace increased the capacity by 15 megawatts in peak-load time. This constituted about 60 million forints in savings calculated at the investment values of that time; officially, only about 6 million forinsts have been acknowledged because of the intermittent nature of the operation. At that time this amount was equal to the total annual budget of our institute.

In import materials, our achievements results in savings ranging between 0.5 and 2 million forints by improving the oil coolers of Diesel engines and other enclosed air coolers.

In the field of de-dusting, where an economic evaluation of the savings is not always possible except when amortization savings or lifespan increases in materials can be directly calculated in forints, in the majority of the cases the most favorable aspects of research achievements lies in stopping environmental damages. We have approximately evaluated these damages on the basis of data published by American and British sources. In the United States, the annual per capita dust damages amount ot 10 dollars; to keep this on the same steady level, an additional 66 cents per capita must be invested annually. In England the situation is somewhat worse. In our trial calculations we have taken the following data into consideration: the territorial area of the country, the number of residents, the consumed coal quantity, the ash and sulphus content of the coals, etc. By means of these data we were able to determine the value of annual dust damages in Hungary; the obtained figure came close to 2 billion forints. However, in our calculations we assumed that the efficiency of our coal purifying installation for separating the flue gases of high ash and sulphur content is equivalent with those used abroad. As I have mentioned before, these figures were the results of trial calculations, and we do not have any significant data for a nation-wide estimation except some domestic data on air-contamination and fly ash dispersion. If we take any fraction of the above-mentioned dust damages, we can see that even if the result would be only a one or two percent increase in the de-dusting efficiency the investments are abundantly compensated for.

It would take us too far to duscuss all the economic aspects of our various research projects presently in effect.

Summarizing the above presented facts, the state subsidies which our institute has enjoyed for the last ten years are roughly equal to the estimated equivalent value of our achievements introduced into practice in the past two years. We expect a great deal of help from the newly established National Administration of Power Economy (Orszagos Energiagazdalkodasi Hivatal) in putting our technical results into practice and securing further export possibilities.

III. Perspectives of Future Research

In the foregoing discussion I shall take up the basic goals and topics of our future research projects. Our plans

should be coordinated with the national power plan presently designed for the next 10 to 15 years; although no numerical data have been published, we have enough data available to determine the main line of our work.

The following guiding principles have been set forth for our future work:

1. The proportion of basic energy carriers will considerably change in the next 15 years. The proportion of imported energy carriers--primarily mineral oils--will also gain, and this will constitute a basic change in our power system.

2. The further increasing coal production will widen the use of poor quality coals for power.

3. We must also extend our domestic power base mainly in the field of agricultural power and local energy sources.

4. The efficiency of energy transformation and heat utilization must also be improved.

5. We must include in our thermal research projects all fields where the power consumption or technology must be improved.

6. Preparations must be made for thermal, water-chemical, and dust problems in conjunction with atomic power plants, which can be handled within our means.

We also wish to alter our research methods as follows:

1. We should maintain a better relationship with domestic and foreign institutions by arranging common projects if necessary. The experience of the friendly state should be increasingly utilized.

2. In our research technology we should develop many-sided solutions, thus making our industry more competitive by means of modern installations.

3. In the future, more time should be devoted to basic research. Modern research methods should be further developed with the emphasized application of automation.

We shall itemize each of our perspective plans in the foregoing discussion, considering the above described principles.

1. Research in Stoking Techniques

a) The specific weight of industrial grate boilers must be reduced and further research must be conducted in coals of a relatively high coal dust content.

We must devise new preparation methods in the furnaces of high-capacity coal dust fueled boilers. The necessary equipment, including the coal crushing mills, should be further improved. The capacity of the crushing mills should be increased from 25 tons per hour to 230 or 350 tons per hour, depending on the boiler capacity involved.

The presently used mills should also be developed, considering the fact that in ten years the capacity of crushing mills must rise to 50 megawatts. We should attain a better specific energy and material consumption. If maintenance and energy costs were decreased by only 15 percent, more than 4 million forints could be saved annually.

In the future, the slag-melting stoking processes should be given more attention, primarily by stoking the intermediate products of older brown coals or black bituminous coals. The Szikla-Rozinek stoking method can also be considered in boilers having a capacity lower than 50 tons per hour.

We must investigate further the stoking techniques of those coals which cannot be burned alone with good efficiency; along with the lignite experiments, we must solve the utilization problems of the Pecs-Komlo, Pilis, and Nograd coals.

b) We must prepare ourselves to cope with the problems of oil-fueling. In the next ten uears the oil production is expected to be five times as high. The primary task is therefore to organize the most economically distribution and fueling processes by developing suitable oil-gas burners for our small and medium capacity boilers. For the high-capacity boilers and great energy-consuming industrial furnaces, perfectly controllable direct nozzles should be developed which are not sensitive to fluctuating oil viscosity.

We also have to consider the question of supplying households with fuel oil by developing simple and inexpensive burners to be used in conjunction with the presently used firewood or coal ovens.

2. Steam Boilers

With the collaboration of other research institutes, we must develop a new standard type of small and medium capacity industrial boiler which could be manufactured from domestic materials and installed as a preassembled or semi-finished unit. We have to make approximately 870 boilers with a capacity of 1 to 15 tons per hour and with 12, 25, and 40 atmospheric pressure ranges to replace the old and obsolete units.

The reason for this astonishing number is the following: in examining 4,500 registered steam boilers, we came to the conclusion that 1,477 boilers are either more than 50 years old or have been currently operated with a 30-percent reduced pressure level. The total capacity of the scrapped steam boilers is 2,090 tons per hour, while that of the replacement boilers would be 3,090 tons per hour.

We must deal with the following questions in order to increase the economy of the operations: temperature conditions in furnaces, dew point, greater "kzanvizso" [boiler flow?] concentration, double evaporation, steam separation, and finally the problem of lightweight and high-capacity air superheaters.

3. Problems in Gas Dynamics

The experiments with centrifugal separators must be continued and the achievements must be put into practice as soon as possible. New de-dusting equipment must also be developed to be used in open or semi-open cycle boiler stoking methods.

We must also consider the development od electric filters and new types of abrasion-resistant waste gas ventilators.

4. Gas Production

The presently used rotary grated generators must be made adaptable for coals of low calpricity and high ash content. A new generator type must also be developed, mainly for small plants of remote locations; these generators should be free of by-products and should also process the gas-liquor and tar as well.

New methods must also be worked out for gasifying mineral oils. In this question we should investigate the methods being used in the more advanced countries which have their own oil supplies. However, the methods of gasifying simpler and cheaper gases similar to the generator gases should be separated from the gasification of oils replacing lighting gases.

5. Water Treatment

We must develop a direct chemically desalinized water supply for the high-parameter steam boilers. The blended desalinization method should be extended to a large-scale process, while the cleaning problem of waste waters should also be solved in large parameter boilers. New corrosion-protective and steam-cleansing processes should also be devised. The utilization of waste waters should be worked out at places where water shortage is a problem.

6. Heat Exchanger Installations

The capacity of our small-finned heat exchanger elements must be increased and their application widened. New heat exchanger equipment should be worked out for utilizing waste heat. The scope of research should be extended to the thermal installations of the food industry and other light industries.

7. Cooling Techniques

The research and development of industrial cooling equipment should also be included in our program. We must investigate the possibilities of using the large-scale absorption process, primarily for the utilization of the waste-heat.

8. Power Engines

We recommend the re-inclusion of stable gas-turbines and axial compressors in the program besides the steam-turbines and high-speed steam engines.

9. Atomic Power Plants

Preparations should be made for solving the expected problems of this future field. We have to assume that the great majority of the atomic equipment to be installed in Hungary will be manufactured abroad. However, there are many other problems besides the economic and theoretical investigations which necessitate the domestic production of certain installations.

Evidently, the first task should be to develop domestic heat exchangers. The problem of water supply is also important because it depends on the location. Recirculated cooling and liquids and other cooling agents should also be examined for this application. Modern processes should be worked out for continuous cleaning of the cooling agents of the reactor or the secondary cycle.

The special installations, steam dryers, superheaters, etc. of the working cycle should be carefully investigated on the basis of suggestions made by Dr Heller and Dr Levai.

The above cited examples were only the most important ones concerning the atomic power plants, although this task can presumably be solved by the long-range plans of our institute. I should like ot emphasize the importance and urgency of the atomic power plants because of their high complexity.

Naturally it has been impossible to cover all the present problems in this lecture. I have also endeavored to give a short insight into our future plans. In the next series of lectures our associates will discuss our results in detail. I am deeply obliged to all the people who have worked with me and contributed their efforts to our success. I also thank the other research institutes and industrial plants for the cooperation by which they helped us to complete our achievements.

I sincerely hope that these lectures will contribute to the development and future progress of Hungarian industry and the fulfillment of the plans based on our ten years of experience.

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HUNGARY

The Size and Sources of TSZ Investments

[This is a translation of an article by Jozsef Reisz in Kozgazdasagi Szemle, Vol VI, No 12, December 1959, Budapest, pages 1320-1335; CSO: 3453-N]

In view of the large-scale development which the TSZ's have undergone in 1959, one of our most important central tasks is to supply them properly with investment funds. This task and the considerable interest in TSZ investments require that we sum up the experience acquired in this field during the past ten years.

The Development of Fixed Capital in the TSZ's

If the private farmers sign their declarations to join a TSZ and begin to farm collectively, this in itself will not convert a TSZ into a large-scale farm. Although simple cooperation can produce results, the advantages of large-scale farming can be exploited only if the TSZ has the fixed capital which such farming requires. Naturally, large-scale farming also has other prerequisites--for example, artificial fertilizers, modern livestock and crop production methods, skilled agronomists, good morale, etc. But it is especially important to ensure suitable buildings for the livestock, storehouses and granaries, bins and silos, electricity and water, good roads, modern machinery, and--last but not least--the required livestock density.

Under the postwar land reform, hundreds and thousands of formerly landless peasants and small farmers were given land. The New farmers were able to acquire only gradually the teams and equipment needed for their farms. These production means, however, were suitable only for small-scale farming. Before the war, most small farmers lacked the necessary equipment. Even on the majority of the kulak farms the equipment was obsolete. Only the large estates had equipment and installations for large-scale farming, although many of the buildings could

be placed in this category only because of their size. Only a few model farms had modern equipment and machinery. Most of these model farms were merged or converted into state farms. Thus, at the start of the collectivization of agriculture in Hungary there were very few large-scale installations that the TSZ's could use.

The fixed capital of the TSZ's in 1949 totaled only 84 million forints but increased rapidly thereafter. From 1950 on, the fixed capital of the TSZ's developed as follows:

As of 31 October	Value of Fixed Capital		Average Value of Fixed Capital per Cadastral Yoke	
	Million Forints	Index	Million Forints	Index
1950	371	100	570	100
1951	803	216	852	149
1952	1,646	443	1,603	281
1953	2,049	552	1,151	202
1954	2,482	669	2,037	357
1955	3,092	833	2,315	406
1956	2,102	566	2,378	417
1957	2,711	731	3,140	551
1958	3,459	932	3,448	605

Most of the fixed capital expropriated from the landowners and kulaks was given to the state farms. The TSZ's got only what the state farms had left them. The state gave the TSZ's a considerable portion of this fixed capital in the form of Land Fund (Foldalap) allotments, at a nominal fee, in indefinite tenure.

The ratio of Land Fund allotments in proportion to the total fixed capital of the TSZ's was 9.8 percent in 1949 and 11.7 percent in 1955. Thereafter, this ratio declined slightly, totaling only 10.7 percent in 1958. Even though the Land Fund allotments were not always suitable for large-scale farming, they enabled the TSZ's formed in the first years to overcome their initial difficulties. In the following years many TSZ's acquired modern buildings and tore down the unsuitable buildings given them from the Land Fund, theregy gaining good construction materials at low cost.

Characteristic of the collectivization of agriculture until the end of 1958 was the fact that the majority of the members (about 70 percent at the end of 1958) were agrarian proletari-

ans who had neither livestock nor other property to bring into the TSZ's. The few small farmers who entered brought in their fixed capital, primarily their implements. In most cases these implements were unsuitable for large-scale farming and the TSZ's could use them only temporarily. Some of the implements brought into the TSZ's in this manner were unsuitable even for temporary use, but the entrants were nevertheless paid (sometimes even overpaid) for their implements.

Thus the bulk of the fixed capital on the TSZ's had to be new. Until 1956, the volume of TSZ investments increased year by year. In 1956, however, the counter-revolution cut the value of the TSZ fixed capital by nearly one billion forints. In the dissolved TSZ's the value of the fixed capital pledged as collateral for their outstanding debts was 624 million forints. On the remaining TSZ's many million forints' worth of fixed capital was destroyed or looted. In 1957, the year of consolidation, the TSZ fixed capital increased by more than 600 million forints. This sum included 213 million forints' worth of fixed capital salvaged from the dissolved TSZ's. The TSZ fixed capital again increased in 1958, by more than 700 million forints, surpassing the highest level that existed prior to the counter-revolution. Most of the new investments were designed especially for large-scale farming, but as yet not all of the requirements have been met. Although suitable for mechanization, the majority of the barns have not been complete mechanized. Electricity and running water have been installed in most cases. Milking with machines, the mechanized transportation of the feed, and the disposal of the manure have yet to be solved. The plans for many new barns, however, were unsuitable. Their construction was faulty and not very durable. The so-called tie-rod barns were built on the basis of such plans. Their general appearance was good, and their cost was seemingly low. However, after four or five years of use, serious structural faults began to appear. Most of these barns had to be remodeled. The cost of remodeling and repairs usually exceeded the original construction cost and amounted usually to about 60 to 70 percent of the cost of new modern buildings. The barns remodeled in 1958, for example, could accommodate 7,700 head of cattle. Although the government bore the bulk of the loss, the faulty buildings undermined the TSZ members' willingness to undertake new investment projects. The 1958 standard plans, however, remedied the previous shortcomings. The buildings erected on the basis of the new plans proved excellent propaganda material for the collectivization of agriculture.

The rapid progress in 1959 in the collectivization of agriculture makes it necessary to bring up the problem of simple buildings again. As soon as possible, the new and increased TSZ's must build for their joint livestock low-cost buildings that require comparatively little construction material. The types of buildings to be built, however, must be carefully selected. It would be unwise, for example to build temporary cattle barns. But under the existing conditions it is feasible to build temporary sheds for calves, hogs, sheep, and poultry. Careful cost calculations and comparisons must be made in each case. Very often the specific annual depreciation per head of livestock is higher for the temporary buildings than what it would be for the modern permanent ones.

The Amount of the TSZ Fixed Capital[1]

The estimation of the average amount and forint value of the fixed capital required per cadastral yoke depends on many factors. The methods of the computations made by the various organs differ considerably. The Hungarian National Bank based its estimates on a desired livestock density of 25 head of standard livestock per 100 cadastral yokes. [One head of standard livestock equals 500 kilograms of live weight.] The computed average fixed capital requirement per cadastral yoke includes the value of the livestock, the farm buildings needed for the livestock, and the machinery and installations.[2]

Naturally, the computed average fixed capital requirement does not mean that farming on the TSZ's can be successful only if this level has been achieved. The experience of several hundred TSZ's proves that it is possible to farm well even though the fixed capital is below the required average. We will be able to achieve the comparatively high estimated fixed capital requirement only in the coming years. The present livestock density is still below the 25 heads per 100 cadastral yokes used in the estimate. At a certain level of development, however, the average amount of fixed capital required on the TSZ's will reach and even surpass the estimated level.

Average Value of Fixed Capital per Cadastral Yoke on 31 October 1958

Amount of Fixed Capital (forints)	Group Average	Number of TSZ's	Percent
Up to 1,000	782	126	4.8
1,001 to 2,000	1,773	364	13.7
2,001 to 3,000	2,548	675	25.5
3,001 to 4,000	3,450	564	21.3
4,001 to 5,000	4,458	371	14.0
5,001 to 6,000	5,470	203	7.7
Over 6,000	8,290	344	13.0
Average	3,448	Total 2,647	100.0

The fixed capital is less than average on about 44 percent of the TSZ's, average on 21.5 percent, and above average on 34.7 percent. About 20 percent of the TSZ's have the estimated amount of fixed capital required per cadastral yoke. Including the 1959 investments, about 30 percent of the TSZ's that were in operation in 1958 are fairly well supplied with fixed capital.

In addition to the existing and new investments, the average amount of fixed capital per cadastral yoke on the TSZ's is also influenced by the development of their plowland acreage. The TSZ acreage increased in 1958 by about 140,000 cadastral yokes of plowland. In view of the fact that the ratio of fixed capital on the newly acquired acreage is comparatively low, this reduces the over-all TSZ average. On 126 TSZ's the fixed capital per cadastral yoke is less than 1,000 forints. The acreage of the TSZ's formed in 1958 exceeds the total acreage of these 125 TSZ's. This leads to the conclusion that the amount of fixed capital per cadastral yoke on the TSZ's formed before 1958 exceeds 1,500 forints.

In analyzing the fixed capital of the TSZ's it is necessary to take into consideration the fact that the bulk of the major machines belong to the MTS's and not to the TSZ's. The MTS's, however, service primarily the needs of the TSZ's. Furthermore, the TSZ connecting roads and power lines are not included in the TSZ fixed capital. The cost of these expensive investments was borne by the government. The follow-int table shows the [total] lengths and construction costs of the TSZ connecting roads and power lines built to date:

	Number of TSZ's	Kilo-meters	Million Forints
Construction of power lines:			
1955	118	170.0	11.4
1956	117	95.0	6.3
1957	47	44.0	4.2
1958	161	265.0	19.0
1959	271	320.0	40.0
Total	784	894.0	80.6
Road construction			
1955	39	54.0	25.2
1956	21	30.2	14.2
1957	7	12.6	4.3
1958	45	68.2	39.7
1959	75	12.5	60.0
Total	187	180.5	143.6

The construction of connecting roads for the TSZ's is costly, slow, and difficult to solve. According to the present averages, the construction cost of the TSZ connecting roads is 80,000 forints per kilometer. It would be practical to examine how the construction of these connecting roads could be solved in the form of voluntary work, with the widest possible participation of the rural population. If the government alone is to build these roads, the TSZ's will not be adequately supplied with roads even if the road construction projects are continued for many years. The situation is much better with respect to the construction of power lines. It seems probable that within a few years all TSZ demands will be met. The average construction cost of the transmission lines is about 90,000 forints per kilometer.

The Composition of the Fixed Capital

The fixed capital of the TSZ's can be divided into the following four major categories: buildings, machinery, livestock, and other fixed capital. The table below shows the development and ratios of the various categories of fixed capital.

A = forints; B = percent

Year	Buildings A	Buildings B	Machinery A	Machinery B	Livestock A	Livestock B	Other A	Other B	Total A	Total B
1950	284	50	72	12.3	210	37	4	9.7	570	100
1951	367	43	124	14.2	346	41	15	1.6	852	100
1952	564	35	238	15	636	40	164	10	1,603	100
1953	432	38	176	15	411	36	132	11	1,151	100
1954	782	38	303	15	654	32	298	15	2,037	100
1955	951	41	361	16	661	29	342	15	2,315	100
1956	1,058	44	382	16	533	22	405	17	2,378	100
1957	1,456	46	581	18	626	20	476	15	3,140	100
1958	1,539	45	585	17	732	21	592	17	3,448	100

The rates of development in the various categories of fixed capital are closely interrelated. The most obvious interrelation is between the size of the livestock and the capacity of the farm buildings. From 1950 through 1958, the buildings were usually built first, and the livestock was acquired later. Consequently, a portion of the capacity of the buildings--especially that of the poultry sheds--was left unused. The average acreage per TSZ was comparatively small. But the TSZ's reckoned with the possibility of future expansion and planned their buildings with capacities larger than were needed at that time. Most dairy barns were built to accommodate 50 to 100 cows each, even if the dairy stock was smaller. The two setbacks in the development of the TSZ's are best reflected in the size of the livestock. The drop in the TSZ livestock was considerable, especially after the counter-revolution--410 million forints. By 1958, however, the average TSZ livestock density per cadastral yoke already exceeded the 1955 level, the record high prior to the revolution. This density is still low--only 19 heads of standard livestock per 100 cadastral yokes. It would be desirable to increase this density to 25 heads per cadastral yoke within one or two years.

The machine stock of the TSZ's can be expected to increase in the coming years. The major machines (trucks, [Czechoslovak] Zetor tractors) are strong incentives for private farmers to join the TSZ's. These machines are not widespread in the TSZ's because few were available. Another reason is the substantial discount which the MTS's give the TSZ's on their rates. Were the MTS rates determined on the basis of production costs, and were the TSZ's able to buy fuel at the same price as the MTS's, the TSZ members would be more eager to acquire Zetor tractors and other machinery. The "other

fixed capital" category has developed rapidly since 1952, but the rate of development is comparatively slow for vineyards (primarily for the vineyards that produce dessert grapes) and orchards.

The Sources of TSZ Investments

The Indivisible Funds and the TSZ's Own Resources

After their formation, the TSZ's are generally unable to acquire from their own resources the fixed capital which they need. For this reason, it is essential that the government aid the new TSZ's in order to help them consolidate. But regardless of the amount of government aid, it is essential that the TSZ's also contribute toward financing their investments. Government aid serves to supplement their own resources. At present, however, the ratio of government aid is still higher than the ratio of the amount which the TSZ's contribute from their own resources.

Ever since the start of collectivization, there has been considerable controversy over how to increase the TSZ's own resources. Even the definition of the term "own resources" varies. The majority of the TSZ's and some local council officials interpret this term to include certain investments which the TSZ's finance not from, or only seemingly from, their own resources. For example, if a TSZ sells some of its fixed capital and uses the proceeds to finance an investment, this will cause shifts in the indivisible fund and fixed capital but will not increase the latter. N r is there any fixed cpital increase from TSZ resources if the construction brigade of a TSZ does the work but the Hungarian National Bank lends the TSZ the equivalent of the cost of labor. Free grants, government price subsidies, and turnover tax rebates must be added to the indivisible TSZ fund. But when the ratios of the government loans and TSZ resources are determined in an investment plan, these grants, price subsidies, and rebates cannot be taken into consideration. Thus the TSZ's own resources include only what the TSZ accumulates from the value it produces. This also includes payments on loans. The TSZ's own resources may be in cash or in kind. The latter includes labor, hauling, and the materials which the TSZ provides or produces.

As of 31 October	Fixed Capital (forints)	Indivisible TSZ Funds (forints)	Fixed Capital from Other Sources (forints)	Ratio in Percent 2:1	3:1
	1	2	3	4	5
1950	570	347	223	60.8	39.2
1951	852	517	335	60.7	39.3
1952	1,603	778	825	48.5	51.5
1953	1,151	485	666	42.1	57.9
1954	2,037	852	1,185	41.8	58.2
1955	2,315	903	1,412	39.1	60.9
1956	2,377	945	1,432	39.8	60.2
1957	3,140	1,312	1,828	41.8	58.2
1958	3,448	1,393	2,055	40.5	59.5

The ratio of the indivisible fund in proportion to the total fixed capital was the highest in 1950 and 1951. This can be attributed to the allotment of fixed capital from the Land Fund and to the comparatively low volume of investments. In the preceding years, the TSZ's received certain investments from the government free--i.e., without having to repay their cost. For the years prior to 1958, the exact value of these free investments--like the already mentioned differences arising from the methods of assessing the value of the TSZ fixed capital--cannot be determined. We estimate that the government contributed about 40 percent of the total indivisible TSZ funds. From the 1958 financial statements of the TSZ's, the government's contribution was determined exactly--the total TSZ indivisible fund in 1958 increased by 264 million forints, of which the government's contribution was 96 million forints.

Efforts to increase the TSZ's own resources met with moderate success. Prior to 1956, the so-called loan norms determined the maximum amounts which the TSZ's could borrow to finance their investments. The loans were granted under the condition that the TSZ's would provide from their own resources the funds needed in excess of the loans. The norms were determined in percentages of the cost or acquisition price. They also played a regulatory role. Thus, the government set high norms for the investments it regarded as more important. A similar system of norms was introduced for loans to finance the purchase of joint livestock. For example, a TSZ was granted a loan of 5,000 forints per cow. If the purchase price was higher than this amount, the TSZ was required to cover the difference from its own resources.

Later this system was modified in that the loan norm was set at 20 percent of the annual total investments.

The system of loan norms proved unsuitable. The requirements concerning the amounts which the TSZ's had to contribute from their own resources made no distinction between the financially strong and the weak TSZ's. Furthermore, the loan norms for certain investments were set too low, and not every TSZ was in a position to undertake to pay the difference from its own resources. The investments, especially construction work, had to begin early in the spring. The TSZ's, however, were able to provide funds only in autumn, after their annual meetings. If the investments were started in spring, the loans usually ran out, and the projects had to be suspended until autumn. In most cases the TSZ's were also unable to provide their share of the cost of the livestock purchased. Needing the livstock badly, they circumvented the regulations. For example, a TSZ would obtain a loan of 60,000 forints for 12 cows. Being unable to provide the additional 12,000 forints from its own resources, the TSZ would buy only 10 cows with the 60,000 forints it borrowed. Since 1957, however, the branches [of the Hungarian National Bank] which grant the TSZ's loans have not been bound by norms or guiding prices. On the basis of the TSZ annual budget and production plan, the bank determines separately for each investment the share of the cost which the TSZ must provide from its own resources. Here again the loan is granted under the condition that the TSZ undertakes to supply its share of the cost, but now this share must be secured in advance. It may still happen that the investment is begun sooner than the TSZ is able to mobilize its own resources. But since the production plan of the TSZ shows sufficient reserves for the resources of the TSZ concerned, the bank can advance the needed amount by granting the TSZ a short-term loan.

Another form of increasing the TSZ's own resources is the accumulations required by their by-laws. Prior to 1956, the rate of this compulsory accumulation was 10 to 15 percent of the total annual TSZ income. After the counter-revolution, the rate was reduced to 5 percent of the total paid to the TSZ members for their work units, including the payments in kind. In 1959, the rate was changed to 10 percent of the total cash payments to the TSZ members for their work units. The 10-percent accumulation includes any investments or acquisitions made with TSZ labor in the course of the year. Any increase in the value of the TSZ livestock, as well as

the natural increase of the livestock raised in accordance with the production plan, can be added to the TSZ's own resources.

Special mention must be made of the loans and the TSZ's own resources in connection with the acquisition of breeding animals or teams. Prior to 1959, it was more advantageous for the TSZ's to purchase their livestock mostly from loans. If the TSZ's expanded the size of their livestock with animals which they themselves raised, this would mean that they paid out more work units and had only expenses but no income for two or three years. The TSZ's were able to acquire an income sooner if they fattened and sold the natural increase of their livestock and applied for loans to purchase breeding animals. This tendency is reflected in the following figures:

According to the 1958 financial statements of the TSZ's, the total value of their breeding animals, teams, and young livestock was 734 million forints.

In the 1949-1958 period, the loans granted to the TSZ's for purchasing livestock totaled 744 million forints.

Naturally, these figures do not mean that the loans exceed the total value of the livestock. The intermediate-term loans were partially repaid and partially canceled. According to the financial statements for 1958, the unpaid balance of the loans granted the TSZ's to purchase livestock was 529 million forints. Thus the indivisible TSZ funds accounted for 40.5 percent of the total fixed capital, and within this, for only 27.8 percent of the value of the livestock.

If, instead of the forint value of the livestock, we consider the number of animal purchased, the results will be basically the same. Data on the number of animals purchased are available from 1953 on. The amount of livestock purchased was as follows: 79,700 head of cattle, 85,000 head of hogs, and 21,100 horses. According to the Central Bureau of Statistics, on 31 December 1958 the TSZ's had 93,900 heads of cattle (including 44,200 cows), 228,000 hogs (including 35,500 sows), and 30,800 horses.

In view of the fact that in the 1949-1952 period the loans granted the TSZ's to purchase livestock were substantial, the number of animals purchased is almost more than the TSZ live-

stockon 31 December 1958. Especially important is the fact that 85 to 90 percent of the cattle purchased consisted of cows or pregnant heifers. The percentage of sows among the pigs purchased was about the same. Thus, the number of cows and sows purchased excceds their numbers as of December 1958 Even if we take into consideration the natural mortality rate and the losses incurred during the counter-revolution, these numbers reflect the tendency of the TSZ's to raise very few animals from the natural increase of their own livestock and to purchase rather than to breed livestock.

One of the most important problems of increasing the TSZ investment today is to examine the possibilities of increasing the TSZ's own resources. Many TSZ's show a reluctance to use their own resources to finance investments, even when they have sufficient resources for investment purposes. The TSZ's often pay their members 50 to 60 forints or even more per work unit but want to finance their investments entirely from loans. Their most frequent argument is that the members who have entered recently contribute less toward increasing the TSZ's own resources. The regulations concerning compulsory accumulation do not mean that the [value of] the indivisible TSZ fund must be increased by 10 percent of the total cash payments to members but that this amount has to be allotted to the indivisible fund. Owing to the fact that the TSZ's do not compute depreciation, it may happen that the depreciation of the indivisible fund is higher than the amount of the compulsory accumulation.

It would be advisable to examine the possibilities of revising the rate of compulsory accumulation. The accumulation could be broken down into two parts. One part would be at least as much as the depreciation of the TSZ fixed capital. The other part would ensure at least a minimum accumulation. The 1958 TSZ financial reports showed that if we discounted the government support granted the TSZ's the share of the TSZ's own resources in their indivisible fund would be hardly more than the estimated depreciation of the fixed capital.

The ration of the TSZ's own resources is usually higher when they undertake the investments themselves than when the work is done by an enterprise. This can be attributed to two causes. First, loans to finance the work done by the TSZ's themselves are granted on the basis of the standard unit prices of the so-called special norms and labor costs (szaknorma es munkabergyujtemeny) issued by the Ministry of Agri-

culture. On the basis of these regulations, the TSZ's may obtain loans to cover only 60 to 80 percent of the labor cost, and the rest represents the TSZ's own resources. Secondly, the enterprises are not interested [financially] in whether or not the TSZ's contribute their own resources. Most TSZ's, especially the new ones, are able to contribute only labor or hauling. If the enterprises so desire, they can use the TSZ labor and hauling. But it is more convenient for the enterprises to have all of the work done by their own workmen.

It would be advisable to determine how much unskilled labor and hauling are needed for the more important construction projects that are based on standard plans, and to require the TSZ's and/or enterprises to provide and/or accept the unskilled labor and hauling, provided that under the specific conditions this solution is feasible. The ratio of the TSZ's own resources could also be increased in their purchases of livestock. Since 1959 the TSZ's have been able to obtain loans in the equivalent of 50 to 60 percent of the cost of raising their own cows. In addition to these loans, the TSZ's may purchase livestock at favorable rates. It would be advisable to examine the feasibility of expanding this system to include livestock other than cattle.

Intermediate and Long-Term Investment Loans

The investment loans granted the TSZ's are of considerable importance. In view of the fact that the increase of the TSZ fixed capital depends mostly on the amount of the government loans, the rate of development hinges on the total amount which the government is able to lend each year to the TSZ's for investment purposes.

The loans are also important for reasons of investment policy. The principles of investment policy which the Ministry of Agriculture works out on the basis of the Party's policies can be carried out best by controlling the loans granted for investment purposes. By granting the TSZ's loans for preferential investments but not for the unpreferred ones, it is possible to set not only the investment aims but also the principles of the development of collective farming. Through granting loans, it is also possible to examine whether the investments are economical. In 1954-1955, when the branches [of the Hungarian National Bank] began to examine more closely whether the amounts billed were acceptable, pay-

ments--mostly to small industry contractors--for more than 10 million forints' worth of unjustified claims were stopped.

The following table shows the total amount of intermediate- and long-term loans granted the TSZ's in the past nine years, and their averages per cadastral yoke:

A = 1,000 forints; B = index

	Annual Total of Loans		Average per Cadastral Yoke					
			Annual Total of Loans		Long-Term		Intermediate	
	A	B	A	B	A	B	A	B
1950	146,249	100	235	100	79	100	156	100
1951	254,860	174	270	115	98	124	172	110
1952	547,740	375	310	132	150	189	160	103
1953	353,335	242	273	116	132	187	141	90
1954	370,282	253	310	132	199	251	112	72
1955	441,001	302	290	123	169	213	121	76
1956	432,823	296	637	271	321	406	315	202
1957	163,263	112	183	78	101	127	84	54
1958	547,413	374	493	210	302	382	191	121

The annual totals of the loans granted the TSZ's were the highest in 1952 and 1956. The average per cadastral yoke was the highest in 1958. After the 1956 countre-revolution, the total TSZ acreage dropped about 900,000 cadastral yokes. For this reason, the average amount of loans per cadastral yoke is seemingly high, but this average includes the loans granted the TSZ's that dissolved during or immediately after the counter-revolution. In 1957, owing to the reductions in the TSZ acreage and livestock, the fixed capital of the preceding years was generally adequate.

Prior to 1958, the investment loans available exceeded the demands of the TSZ's. Each year a portion of the allotments for investment loans remained unused. In 1958, however, the TSZ demands for loans exceeded the total allotted for this purpose in the national economic plans, and the entire allotment was exhausted. In the past year [not clear whether 1958 or 1959 is meant] the supply of materials has been good, planning has improved, and the state and cooperative sectors of the construction industry have undertaken a larger share of the TSZ construction projects. As a result of the proper policies of the Party and the government, the TSZ members are showing a greater effort to increase their investments.

Loans and Economical Operation

In their fear of becoming indebted, many TSZ members have been reluctant to apply for investment loans. In years past such fears were not entirely unfounded. The repayment of the loans was a serious problem, especially in 1953 and 1955-1956. The time within which the TSZ's were obliged to repay their loans was deferred in 1953 for a period of four years. The plans for installment payments were again revised in the autumn of 1956. In the course of the 1956 revision, a 25-year period was set for the repayment of all TSZ loans. The repayment of the newly granted investment loans was extended, and the terms then established are still in force. The terms for the repayment of the loans had to be modified because the vast majority of the TSZ's would have been unable to pay their members even minimum work units if they had paid the installments due.

Nevertheless, I believe that the reluctance to accept loans is unjustifiable. Investment loans contributed to the indebtedness of the TSZ's only to a small extent and in the following cases: if the barns built at comparatively high cost remained completely or partially empty; if the investments were not placed into operation (in 1957, for example, 55 percent of the irrigated acreage was left unused, while in Szolnok Megye only 22 percent of the irrigated acreage was used); if the buildings or installations were built on the basis of unsuitable plans, doubling thereby the construction cost and causing a high mortality rate among the livestock kept in the unsuitable buildings. The vast majority of the buildings, however, served their intended purpose, and the government undertook to bear the losses arising from mistakes made by the directing agencies. Thus, the above-mentioned shortcoming could have been eliminated. In every case the primary reason that a TSZ became indebted was its uneconomical operation. The loans that directly increased the payments per work unit did not serve to promote economy. On the contrary, under uneconomical operation such loans enabled the TSZ members to derive a certain unearned income. Although such loans were partially or entirely secured with the indivisible TSZ funds, the granting of the loans promoted the exhaustion of these funds, while a portion of the loans remained unsecured from the very beginning.

In view of the favorable terms under which the investment loans are granted, the payment of the installments due on these

loans should cause no special problem on the TSZ's, provided that the loans are used economically and that the TSZ members work diligently. In 1957, the installments due on investment loans averaged 65 forints per cadastral yoke. This average dropped to 63 forints in 1958. In view of the benefits granted the TSZ's, these averages were actually lower. The investment loans mean more fixed capital. Studies made up to now by various organs shows that higher averages of fixed capital are usually coupled with higher average production results. This is evident from the results of the study undertaken by the Central Bureau of Statistics for 1956. (On the basis of the average values of their fixed capital, this study divided the 3,261 TSZ's into five categories.) Representative surveys made by the Hungarian National Bank in 1957 produced identical correlations.

The following table shows the average fixed capital and investment loan per cadastral yoke, compiled by the Hungarian National Bank on the basis of the TSZ financial statements for 1958.

Fixed Capital per Cadastral Yoke (forints)	Number of TSZ's	Farming Results	Investment Loans	Payments Due on Investment Loans According to Original Amortization Plan
		(in forints)		
Up to 1,000	126	1,239	669	19.60
1,001 to 2,000	364	1,256	931	28.60
2,001 to 3,000	675	1,440	1,452	45.60
3,001 to 4,000	564	1,656	2,004	64.40
4,001 to 5,000	371	1,746	2,561	84.60
5,001 to 6,000	203	2,068	3,094	96.90
Over 6,000	344	3,113	4,560	153.00
Average	2,647	1,662	1,960	63.00

The "Farming Results" column in the table includes the increase in the net assets of the TSZ's and the total payments (cash and in kind) to members for their work units. The installments due on loans have already been deduced from the amounts shown. The loans granted the TSZ's proved absolutely essential. Without them it would have been impossible to develop the joint assets of the TSZ's, or at least this would require a very long time. Although there were some mistakes

in the utilization of these loans, most of the amount loaned to the TSZ's served to develop collective farming. The major mistake was that the government aid granted to the TSZ's was not concentrated on developing the required amount of fixed capital. In the first years the loans for nonproduction putposes and the grants exceeded the total amount of the loans for investment purposes.

The System of Loan Benefits and Its Role in TSZ Investments

The present system of investment benefits has developed in accordance with the agricultural policies of the MSZMP, formulated in the 1957 Politburo resolution. This resolution states that the government aid granted the TSZ's must serve primarily to increase their production (especially the production of marketable produce) and to develop the conditions and fixed capital essential for large-scale farming.

The system of benefits has played an important role in publicizing the investments (irrigation plants, rice fields, facilities for horse breeding, etc.) were granted the TSZ's in the form of free government aid. Such free grants were abolished in the spring of 1956, but the volume of government aid remained the same. Every benefit granted the TSZ's was attached to one condition--production increase. Thus, the previous system of free grants has been replaced with subsequent partial loan cancelations depending on production results. In order to qualify for benefits, the TSZ's must increase their production. The partial cancelation of investment loans has been introduced for the investments that are either costly or whose development is especially desirable. The system of benefits, however, has certain shortcomings. The system is highly complex and includes too many different kinds of benefits. The methods of estimating the cost of the investments is difficult. The corresponding records become hopelessly confused during the year.

Benefits are now offered the TSZ's for the following investment purposes:

A. Benefits Based on Production Aims

a) Dairy barns. Partial loan cancelations in the equivalent of 25 percent of the investment cost may be granted a TSZ, provided that its average annual milk yield is at least 2,300 kilograms and that the TSZ utilizes at least 80 percent of the capacity of the barn.

b) Silo construction. Twenty-five percent of the investment cost may be canceled from the government loan, provided that the TSZ builds and fills the silo within the time required.

c) Forcing beds heated with thermal water. Fifty percent of the total investment cost may be canceled, provided that the TSZ uses the forcing bed continuously and for the purpose originally intended.

d) The construction of irrigation facilities. Fifty percent of the investment cost may be canceled, provided that the irrigated fields are used for the purpose intended.

e) The construction of fishponds. Twenty percent of the investment cost may be canceled if the fishponds are properly populated.

f) The planting of vineyards and of special plantations that supply cuttings for reproduction. Eighty percent of the investment cost may be canceled from the government loans. Furthermore, 50 percent of the cost of the vine props may also be written off.

g) The planting of orchards. Seventy percent of the investment cost may be canceled.

h) Afforestation. Seventy percent of the investment cost may be canceled.

i) The planting of hop fields. Eighty percent of the investment cost may be canceled. (The partial loan cancelations in items f) through i) are attached to the condition that a certain percentage of the stock planted takes root and that the plantations are given the care they require.)

j) Soil improvement. Upon the proper completion of a soil improvement project, 10 percent of the investment cost may be canceled. Furthermore, the government supplies the materials needed free of charge.

k) Purchases of dairy cows and heifers. Depending on the increase in the milk yield, 10 to 30 percent may be canceled from the investment loans granted to purchase cows and heifers. If a TSZ raises its own dairy stock, it is entitled to a loan cancelation when the cows calve for the first time. The amount canceled is equivalent to 20 percent of the book value of the cows.

l) Purchase of sows. Fifteen percent of the acquisition cost may be canceled.

B. Other Benefits

a) Price subsidies are granted the TSZ's if they purchase cattle, hogs, or sheep. The subsidies are equivalent to the difference between the state-farm prices and the free-market prices.

b) For any type of investment, the TSZ's are reimbursed for the price increases arising from the modification of the industrial producer prices.

c) A TSZ is entitled to benefits if the amount of produce it sells to a certain state or cooperative bulk-purchasing organ reaches or exceeds the marketing quotas per 100 cadastral yokes of "reduced" [in terms of standard] plowland, provided that it has paid the government the taxes payable in kind [grain], has fulfilled its other government obligations, and has complied with the regulations governing TSZ accumulations for investment purposes. These benefits amount to 6,000 forints per 100 cadastral yokes or reduced plowland, plus 100 forints for every percent by which the marketing quota has been surpassed. The total benefits granted on the basis of the marketing quota may not exceed 12,000 forints per 100 cadastral yokes of reduced plowland.

d) If a TSZ pays a higher installment on its loans that what is due, 25 percent of the difference is cancelled from the unpaid balance.

There are in all about 30 different benefits for TSZ investments. It would be advisable to examine how the system of benefits could be simplified and how the benefits themselves could be determined with the aid of a few indices. It is also necessary to examine whether the benefits should be maintained for every investment. In my opinion, the bene-

fits based on purchases of livestock, for example, should be abolished but the benefits granted the TSZ's on the basis of the livestock they raise should be maintained and expanded. The rate of the benefits given the TSZ's for planting vineyards of wine grapes seems excessively high. The entire system of benefits should contain more incentives for increasing the TSZ's own resources. It would be feasible in the case of certain types of investments to base the partial loan cancelations--perhaps in a discriminatory manner--on the ratio of the TSZ's own resources. In view of the fact that the conditions attached to the benefits can be fulfilled only three to five years after the investments are made, the full effect of the system of benefits on the level of farming and profits can be measured only hereafter. Then it will be possible to reduce the volume of loans granted the TSZ's for investment purposes.

The terms and interest rates of the TSZ investment loans are extremely favorable. The interest rate on intermediate- and long-term loans is one percent per annum. The intermediate-term loans are repayable in a maximum of 15 years; the long-term loans in a maximum of 35 years. The first installments on the intermediate-term loans are payable in the second year following the year in which the loans were granted. In the case of long-term loans, the first instalments are due in the fourth year (not including the year in which the loans were granted). It would be necessary to reexamine whether the present terms for the first instalments are justified. The duration of the loans should be better coordinated with the depreciation of the fixed capital.

Major Lessons Derived from the 1959 Investments

TSZ demands for investment loans were already high before the start of the collectivization drive in the spring of 1959. With the formation of new TSZ's, this demand has increased. Despite the fact that the Council of Ministers has on three occasions raised the total [1959] allotments for TSZ investment loans, the entire demand cannot be met. The total allotment for TSZ investment loans is four times as high as in 1958. The total allotments for intermediate- and long-term loans is nearly as high as the total of the loans granted in the 1949-1958 period.

One gratifying phenomenon is that the new members--in contrast to years past--are bringing a substantial number of animals into the TSZ's. According to the Central Bureau of Statistics, more than 100,000 head of cattle were brought in by 31 March 1959. Thus, the TSZ's are using the available loans to finance the following major construction projects:

	Newly Built	Remodeled	Total	Planned Quota
Dairy barns (number of heads)	71,339	40,017	111,356	55,000
Barns for calves and heifers (heads)	29,405	6,206	35,611	70,000
Maternity pens for sows (heads)	15,848	3,461	19,309	13,000
Other pig pens (heads)	51,834	13,891	65,729	230,000
Sheep sheds (heads)	160,350	12,430	174,780	180,000
Poultry sheds (heads)	319,950	29,700	349,650	180,000
Granaries (carloads)	1,102	622	1,724	1,700
Corn cribs (carloads)	1,811	82	1,893	1,000
Tobacco sheds (cadastral yokes)	514	478	992	760
Irrigation (cadastral yokes)	8,166	150	7,316	5,000
Fishponds (cadastral yokes)	1,022		1,022	800

Note: The [above is based on] 15 September 1959 results of the surveys made by the agricultural sections of the [jaras and megye] councils, and by the Hungarian National Bank.

Barns for more than 16,000 head of dairy cows and more than 6,000 maternity pens for sows are being built over and above the original plans. The TSZ's are also utilizing the possibilities inherent in the remodeling of the existing buildings. Calves are temporarily being kept in some of the dairy barns. In comparison with the plans, few pig pens are being built. The TSZ's are becoming acquainted with and are beginning to like the so-called stud and mud farm buildings. Simple calf sheds, maternity pens for hogs, and sheep sheds of this type are being built in a total value of 54 million forints. When the farm buildings are completed, it will be possible to accommodate all of the livestock which the TSZ's bought or acquired from their new members in 1959.

By 15 September 1959, the TSZ's obtained construction loans amounting to 82.7 percent of the total allotment for this purpose. The total amount of [construction] loans was 167 million forints in 1955, and 192 million forints in 1958, in contrast to 449 million forints in 1959. The TSZ's are doing 30.4 percent of the construction work themselves; 17.4 percent of the work is being done by artisans' cooperatives, 37.5 percent by the Ministry of Construction, and 14.7 percent by other state enterprises. [By 15 September 1959] the average construction project was 58.1 percent ready. Within this number, the averages of the various sectors was as follows: Ministry of Construction, 72 percent; other state enterprises, 58.1 percent; artisans' cooperatives, 51.9 percent; construction projects undertaken by the TSZ's themselves, 43.2 percent. The quality of the construction work has improved considerably in comparison to years past. The enterprises of the Ministry of Construction are leading in the quality of the work done. One shortcoming of the construction projects, however, is that the ratio of the TSZ's own resources is very low. In Becs Megye, for example, i. amounts to 43.8 percent in the projects undertaken by the TSZ's themselves and to 0.7 percent in the projects undertaken by the enterprises of the Ministry of Construction. In Csongrad Megye the same ratios are 22 and 0.2 percent; in Gyor Megye, 42.4 and 4.1 percent. (The ratios are expressed in percentages of the total investment cost.)

In investment construction the over-all ratio of the TSZ's own resources is 11 percent of the investment cost. The new TSZ's are contributing comparatively less from their own resources. In Gyor Megye, for example, their contribution is 7.2 percent, while in Bacs Megye--where a large portion of the TSZ's were formed earlier--the TSZ's own resources account for 15.9 percent of the investment cost.

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The development of collectivization is closely connected with the economic aid granted to the TSZ's. It is impossible to satisfy in one year all the investment demands of the TSZ's. But the most important investments have been ensured--for example, the buildings needed to house the joint livestock and the machine work supplied by the MTS's. Computed on the basis of a total TSZ acreage of 3,022,000 cadastral yokes of plowland, the government is providing an average of 381

forints of construction loans per cadastral yoke. In 1958, when the total TSZ acreage of plowland had been only one-third of the present acreage, the total allotment for construction loans averaged only 300 forints per cadastral yoke. As far as the total allotments for TSZ investments are concerned, the averages per cadastral yoke (computed on the basis of the same price level) have increased from 493 forints in 1958 to 874 forints in 1959. Computed on the basis of the present prices, the 1959 average total investment allotment would be 971 forints per cadastral yoke. With these investments the TSZ's are able to establish conditions for large-scale farming that are much more favorable and promising than in years past.

Footnotes

In the books and financial statements of the TSZ's the assessment of the fixed capital varies considerably. The buildings allotted the TSZ's from the Land Fund are assessed far below their actual value. Other fixed capital is assessed at its cost price. The stated values of the vineyards and orchards planted by the TSZ's themselves include only the cost of the stock purchased but not the cost of labor, materials, and carting supplied by the TSZ's. This means that the gross value of the plantations is not recorded. The depreiciation of the fixed capital is also disregarded. It often happens that machines and vehicles that have depreciated 90 percent are still valued at their original cost. Thus, certain types of fixed capital are assessed below their actual value, while others are assessed far above it. In order to obtain the actual value of the TSZ fixed capital, it would be advisable to order a reassessment in the near future and to maintain regular records of capital depreciation.

The average fixed capital required per cadastral yoke of plowland can be estimated at about 7,000 forints (at 1958 consumer prices). This sum includes 4,100 forints' worth of buildings and structures, 1,600 forints' worth of machinery (this includes running water and electricity for the farm buildings), 300 forints worth of vineyard and orchard stock, and 1,000 forints' worth of livestock. This estimate does not include major farm machinery (plowing tractors, universal tractors, etc.), roads connecting the TSZ's with their nearest highways, and soil improvement. Were these items included in the estimate, the average would increase by about 3,000 to 4,000 forints.

HUNGARY

The Problems of Price Determination in the Socialist World Market

[This is a translation of an article by Bela Csikos-Nagy in Kozgazdasagi Szemle, No 12 December 1959, Budapest, pages 1295-1309; CSO: 3422-N]

The Role of Prices in the Socialist World Market

In the socialist world market prices play a role in the distribution and redistribution of the nations' combined total national income and in developing the volume and composition of their foreign trade.

The first role of prices in the socialist world market stems from the fact that the socialist countries conduct their mutual foreign trade as separate entities, and for the goods exchanged they bill and credit each other on the basis of specific prices. In this manner a close relationship develops between the socialist world market prices and the distribution and redistribution of the combined total national income of the socialist countries. The second role of prices in the socialist world market stems from the fact that the socialist countries are free to choose what and how much to export or import. In the international exchange of goods, each country strives to get the best results for its own national economy and to efficiently utilize its own productive resources. Thus, the prices in the socialist world market determine from each country's point of view the optimum volume and the most economical composition of its foreign trade in which the ratio of the world market price level in proportion to the domestic production cost is more favorable for exports than for imports can be determined only on the basis of specific world market prices. Furthermore, such prices are also a prerequisite for determining how the products comprising the volume of foreign trade rank with respect to their economy.

Socialist world market prices determine the distribution and redistribution of the nations' combined total national income but affect only the development of their foreign trade.

The prices determing the distribution and redistribution of the combined total national income because each nation's foreign trade obligations must be balanced. The international exchange of goods is balanced if no country accumulates a foreign trade deficit payable in cash. Were the socialist countries to decide to eliminate or to limit the role which prices play in determining the distribution and redistribution of their combined total national income, they would have to dispense with the principle of balancing their foreign trade and from time to time would have to cancel their credits and debits. The volume and composition of foreign trade are determined by the national economic plans and foreign trade agreements. The prices, however, affect the international exchange of goods. This effect is based on the fact that the only possible means of asserting the efforts to make foreign trade economical is to take the prices into consideration when the plans for foreign trade are drafted.

Economists in general recognize the role of prices in the socialist world market. But it still has not been clarified what these prices must be like in order to meet the requirements of the socialist economy. What are these requirements? First of all, it is the primary interest of the socialist countries to distribute the share of the national income derived from foreign trade, under terms that ensure equal advantages but without a redistribution of this income among the nations concerned. Furthermore, it is also in the basic interest of the socialist countries to have foreing market prices that can consolidate economic cooperation, promote better international division of labor, and ensure the most efficient utilization of live labor and materialized labor.

If in the socialist world market the determination of prices is not substantiated scientifically in a manner that is recognized and accepted by all socialist countries, then each country will regard all price problems only from its own point of view (i.e., whether the prices are favorable or unfavorable for the country concerned) and will separately stribe to bring about changes that are to its advantage. Under such conditions, the prices are the result of bilateral bargaining, which in turn might lead to a tendency to raise the prices and increase the benefits derived from foreign trade by altering its composition accordingly. This would suppress the tendency to coordinate the composition of foreign trade with the requirements of economy.

We must always bear in mind that in judging the economy of foreign trade from the point of view of only one country, our judgement is always based on its existing price conditions. Determined prices, on the other hand, are a prerequisite for judging the economy of foreign trade from the point of view of the socialist countries as a whole; otherwise, the economy of foreign trade cannot be judged at all.

From a single country's point of view, it is entirely indifferent at what price something can be sold or bought. The basic consideration in such cases is that exports provide foreign currency while imports involve the expenditure of foreign currency. The only thing a country can do is to express the existing world market prices in terms of domestic currency, compare them with the domestic production costs, and judge the economy of foreign trade on the basis of such comparisons. As far as exports are concerned, those items will be the most economical for which the world market prices are the highest in comparison to the domestic production costs and the least economical items will be the ones that involve the highest losses.

But there are two sides to foreign trade, and each country strives to improve the economy of its own trade. The price at which an exporting country makes the highest profit can be so high that the importing country might consider it advisable to start domestic production, not only for domestic supply but perhaps for export purposes as will, because the high price might lead to the assumption that the production costs of the exporting country are excessively high. In the case of the most unfavorable prices, on the other hand, the exporting country might decide to discontinue the export or even to import instead, because from the low foreign trade prices it might conclude that some countries are able to organize their production under conditions much more favorable than its own. Thus, were the foreign trade prices unable to meet the requirements of their function as a standard for measuring the economy of foreign trade on an international scale, the advisability of terminating the imports and starting domestic production, or of terminating the exports and converting to imports, might not arise at all.

The examples above clearly show that further improvement in the economic cooperation among the socialist countries requires the scientific elucidation and practical settlement of the problems connected with world market prices. In 1957, the CEMA Permanent Committee on Foreign Trade (KGST Kulkeres-

kedelmi Allando Bizottsaga) established a working committee to study the experience in connection with the application of the present price factors and to determine the world market prices applicable in the foreign trade among the socialist countries. The investigations undertaken in recent years have shown that this task covers a multitude of political considerations stemming from the relations between the socialist and the capitalist world markets. It is also evident that the scientific elucidation of the socialist world market prices requires the clarification of many other problems (cost computation, the determination of domestic prices, foreign exchange rates, etc.) as well. At the recommendation of the CEMA Permanent Committee on Foreign Trade, therefore, this problem was handed over to the CEMA Permanent Economic Committee (KGST Kozgazdasagi Allando Bizottsaga). The latter has decided to debate and approve in the first half of 1960 the program for developing the basic prices in the socialist world market. Under these circumstances, it seems desirable to acquaint our economists with at least some important aspects of the problem in question.

The Nature of the Contract Prices in the Socialist World Market

The exchange of goods among the countries of the socialist world market is governed by bilateral contracts. The values of the goods exchanged are entered in the bilateral accounts in rubles. The clearing ruble is the currency in which the accounts are settled. In the bilateral contracts, the prices are determined in rubles. The clearing ruble was established especially for purposes of foreign trade. The prices expressed in clearing rubles are independent of the domestic prices in the Soviet Union. This means that the socialist world market prices do not restrict the Soviet Union in determining its domestic prices, while domestic price adjustments in the Soviet Union do not affect the socialist world market prices. In view of the fact that in the bilateral trade relations between any two socialist countries the debits or credits on the clearing account must be settled through the exchange of goods, the import and export prices expressed in clearing rubles must be determined on the basis of uniform principles.

In the socialist world market, the prices expressed in clearing rubles are derived to a considerable extent from the

capitalist world market prices, because the foreign exchange rates of the ruble, based on gold parity, are used to express in rubles the equivalent capitalist world market prices given in convertible foreign currencies. In the individual stages in the development of the socialist world market, however, the relations between the prices of the two world marlets developed differently.

From the end of World War II until 1950, foreign trade among the socialist countries was adjusted entirely to the capitalist world market prices. The 1945-1950 period saw the development of the international division of labor among the socialist countries. At that time, the determination of special socialist world market prices was entirely out of the question, and the problem of prices did not arise at all. The socialist countries, on their part, regarded the capitalist world market prices as the only world market prices existing and did not even think that it would be possible to form other world market prices. In other words, the world market was split into two separate markets after World War II, but the unity of the world market prices was maintained. The socialist revolutions which many countrires underwent established the socialist world market as a separate one in addition to the capitalist world market. But at the same time the socialist world market took over the prices of the capitalist world marlet.

Prices in the socialist world market were determined in this manner until the leading capitalist powers began adopting discriminatory measures against the socialist countries. The introduction of these discriminatory measures coincided with the Korean War, which started off speculative price increases in the capitalist world market. Government stockpiling in the United States served to accelerate this process. Under these conditions and in order to prevent the speculative tendencies on the capitalist market from disrupting the foreign trade among the socialist countries, the CEMA countries agreed not to increase the foreign trade prices specified in the bilateral trade agreements for 1949-1950.

This freezing of the 1949-1950 prices at first isolated and then separated the socialist world mareet prices from those of the capitalist world market. A separate price system developed for each of the two world markets. One system was that of the capitalist world market, where the prices changed constantly. The other price system was that of the socialist world market. Here the 1949-1950 prices, and in some cases

the prices that were introduced earlier, agreed with the contemporary capitalist world market prices. Thus, the differences between the two world market prices depended on the price fluctuations in the capitalist world market.

The frozen prices were not uniform, and their application provided certain advantages for the CEMA countries. This was due to many factors. To mention only the most important ones, the frozen prices were distorted by the instability of the capitalist currencies used as standards for the world market prices. (In 1949, for example, England and several other capitalist countries devalued their currencies.) The manner in which the price freeze was introduced and the methods for the further determination of prices also failed to adequately ensure the uniformity of prices or price ratios. The price freeze applied to the prices specified in the contracts. The dates of these contracts varied considerably. After the Korean War, the socialist countries adjusted the prices of certain products. This adjustment was made to boost exports, primarily the exports of finished products. But even these adjustments were made within the framework of bilateral contracts. Thus, it was impossible to ensure uniform prices applicable to all socialist countries.

When the socialist countries introduced the price freeze, they were fully aware of the fact that such measures were inadequate to fill the role which prices must play in the socialist world market. From the very start, the price freeze was regarded as a temporary measure necessary under the conditions then existing. The stabilization of the capistalist world market piices after the Korean War and the prospect of bringing trade reaations between the two world markets back to normal provided the prerequisites for the introduction of a new foreign trade policy. In 1957, the CEMA countries agreed on certain principles for the determination of their world market prices. Based on these principles. the present contractual prices in the socialist world market can be characterized as follows:

1. In view of the fact that the socialist countries are using their foreign trade prices for planning purposes and for balancing their foreign trade, the socialist world market prices are stable and are fixed for a period of at least one year. Only the prices of seasonal agricultural products (for example, fresh fruits and vegetables) are established differently, according to seasons.

2. In most cases the socialist world market prices (primarily the prices of raw materials) agree with the average capitalist workd market prices for the preceding calendar year. In general, the prices in the socialist world market are determined in this manner.

3. The prices applicable on the major capitalist world markets are regarded as the capitalist world market prices. The terms of the contracts are the same as the customary terms on the major world markets.

If a certain product has several major world markets, the selection of a suitable one will depend on its trade relations with, and geographical proximity to, the Soviet-bloc countries. Although the exporting country's interests are also taken into consideration, the importing country's point of view is the decisive one--i.e., from which major capitalist world market would the importing country buy its products if not from its contract partner. The prices applicable in foreign trade between socialist capitalist countries are regarded as the basic prices for those goods which the socialist countries buy or sell in large volumes on the capitalist world market.

4. The basic price used in determining the contract price also includes the shipping cost. In comparison to the basic price, the advantages or drawbacks arising from the geographical locations of the contracting [socialist] countries are divided between the importing and exporting country, in the manner specified in the bilateral contract.

5. The prices are determined when the contracts are signed. If for some reason or other the final prices cannot be determined when the contracts are signed, tentative prices many exceptionally be included. Such tentative prices, however, should not delay the validity of the contracts or the fulfillment of the mutual obligations. The tentative prices usually correspond to the average world market prices. If the prices are tentative, the contracting countries usually agree upon the final prices within three months (or within six months in the case of complete factory installations).

In their bilateral contracts, the CEMA countries apply these general principles with certain modifications. Instead of the average world market prices for the preceding year, for example, the basic prices used in the contracts may be the current world market prices or the average prices computed for a number of years. In some cases, the contract prices

have not been changed from one year to the next, despite the increases in the capitalist world market prices. Practice varies considerably with respect to shipping costs.

Problems Arising from the Application of the Capitalist World Market Prices

The price policy applicable since 1957 in the socialist world market is based on the assumption that the permanent price ratios of the capitalist world market more or less reflect the world market values, and that it is advantageous to adopt and apply these prices in a certain manner in the socialist world market, provided that they are cleared of certain "irregularities." The comparative stability of the prices, their being fixed for a period of at least one year, the disregard of brief price fluctuations, and the averaging of the changing capitalist world market prices are the new characteristic traits in which the post-1957 price determination in the socialist world market differs from the practice used in 1945-1950--the period of the development of the socialist world market.

The fact that the trade relations of the socialist countries take the capitalist world market prices into consideration necessitates a closer study of the nature of these prices.

Only the casual observer will gain the impression that in the capitalist world market all nations are participating as equals, on identical terms. Under closer scrutiny, however, the capitalist world market reflects the dependence of the colonial, semi-colonial, and economically weak nations on the industrially developed leading capitalist countries and the struggle which the capitalist world powers are waging for the territorial distribution and redistribution of the world.

The centralization and concentration of capital have led to the development of monopolies in both the capitalist countries and the capitalist world market. The leading capitalist powers rule the international cartels, often exclusively. The export of capital and political dependence enable the monopolies of the major capitalist powers to organize the production of the economically under-developed nations partially or entirely as owners. This results in the

monopolists of one or a few capitalist great powers being able to join forces to rule the capitalist world market, even with respect to products that are manufactured by other capitalist countries.

We may approach our problem by regarding the capitalist world market prices as expressions of international values (production costs). But such an interpretation is based on the assumption that there is competition within the individual countries and free trade on the world market. Since the rise of monopolies, both domestic competition and international free trade have changed. Trusts have replaced competition within the individual countries, and market control has replaced free marketing in the world market. The world market prices have also become monopolistic. In comparison to the production cost prices, the monopolistic world market prices not only include higher profits but are also less sensitive to market conditions. The deviations of the prices from the values (production cost prices) has increased and has become permanent.

For these reasons it is evident that we must analyze the capitalist world market prices under the conditions of monopolistic capitalism and not of capitalism in general. If we wish to understand the mechanism of the capitalist world market, we must draw a sharp distinction between the international commodity markets ruled by monopolies and the ones in which trading is still being conducted more or less on the principle of free trade. Otherwise, we would be unable to explain such price phenomena as, for example, that in the world markets for colored metals in the late 1950's. In the capitalist world market the price of copper dropped sharply, but in the tin and nickel markets (these are ruled by monopolies) the prices have remained comparatively stable. The same phenomena can also be noted in the market for machine industry products. The prices of the machinery which the highly specialized and practically monopolistic factories piece-produce on the basis of special orders have remained more or less stable, while the prices of the machine industry products which many countries manufacture in series have dropped to varying extents. There are monopolies, but not in every branch of production, nor do they affect every branch of production in the same manner. Consequently, the capitalist world market prices can never be homogeneous.

It can be assumed that the rule of the monopolies involves government favoritism. Because of this government favoritism

(the so-called policy of economic intervention), the international price ratios and the relations between the domestic and the world market prices undergo peculiar changes.

Under monopolistic capitalism, the automatic formation of prices through supply and demand and the automatic regulation of production on this basis are encountering increasing difficulties. With their political power the monopolies are able to persuade the government to influence the market in their favor. One important way to achieve this is to grant the monopolies government contracts. This is especially feasible under the militarization of the capitalist economy.

In connection with the militarization of its economy, the government is obliged to take in the form of taxes an increasing share of the net national income in the prices. The tax policies of the industrially developed capitalist countries are based predominantly on direct taxes. The government does not tax that share of the profit which is used to finance further production (the expansion of production, technical development, research, etc.). But the taxable share of the profit is taxed pregressively. The monopolies not only make a profit from their monopolistic position but also conduct business policies that enable them to keep a large share of their monopolistic profit and to pay the government as little taxes as possible. Because the monopolies develop mostly in marketing, the monopoly prices are indirectly reflected in the production costs (prices) of the productive industries, regardless of whether the prices of the semi-finished or finished products are in themselves monopolistic or not.

In the capitalist countries, a part of the profits collected by the government in the form of taxes is used to influence prices. In the United States, for example, the Commodity Credit Corporation keeps the producer prices of the most important agricultural products at a level determined by the government, guarantees that the government will buy at this price level, and thus subsidizes agriculture. The Office of Civil Defense Mobilization influences the market for strategic raw materials through purchases and sales. Military contracts granted by the government influence the prices of many products, causing them to deviate from their values (producer prices).

In a specific manner, government favoritism links or separates the domestic prices and the world market prices.

Taxes, customs duties and foreign currency policies are equally used for this purpose. Through these means and, if necessary, import restrictions (a complete embargo on certain products, import quotas, restrictions permitting import only from certain countries, etc.), the capitalist government protects the price conditions that favor the most powerful domestic monopolies. The government also grants benefits to promote export and even subsidizes it. Such practics help to explain, for example, a peculiar phenomenon of the large-scale drop in the capitalist world market prices of raw materials in the late 1950's--the prices often dropped below the production costs, without driving the capitalists into bankruptcy. By abolishing or reducing the taxes on exports, by devaluating the domestic currency, by granting more favorable rates for the foreign currency earned, and by other means; the capitalist countries strive to compensate the capitalists partially or entirely for the losses which they would otherwise have suffered from the low world market prices. Supporting government purchases are another form of government aid for the capitalist enterprises that manufacture for export. These purchases reduce the volume of goods offered for export and thus prevent any drop in the capitalist work market prices.

If at permanent international values the world market price changes but the capitalists' share of the price remains the same, only the part representing government revenue can change (increase or decrease). Through the price, the government in such cases redistributes the net social income on an international scale, employing operations that are more flexible and can be adjusted better to the changing economic trends. If, on the other hand, both the world market price and the capitalists' shasre are kept unchanged through supporting purchases or sales made by the government, the purpose of these operations is to prevent the international redistribution of the net social income.

Characteristic of the capiatlist world market is the differentiation of its prices. The capitalist world market price is a joint expression of all prices on the capitalist world market. The existence of international cartels not only fails to end the differentiation of the capitalist world market price but very often even intensifies it. Cartel agreements may be limited to the allocation of markets, in which case each cartel member formulates his own price policy on his market. Some international cartels limit their common price policies to specified fields, outside of which the

prices are determined through bargaining. We know of some international cartels that are unable to enforce common price policies. But even if a single cartel were to rule the entire capitalist world market, this would not necessarily mean identical prices for every country. Quite the contrary. For its individual markets such a cartel would probably formulate separate price policies that best serve its interests under the specific local conditions, especially with regard to the products manufactured by the processing industries. Furthermore, it is also evident that in international trade the local companies that have the same financial interests will not necessarily charge or pay each other the same prices as are applicable in trading between companies having different financial interests.

Government favoritism also leads to the differentiation of the world market price. Every foreign trade deal involves at least two countries and is subject to their trade regulations. As we have seen above, the capitalist countries protect the price conditions that favor their own domestic monopolists. Consequently, the different domestic price conditions necessarily affect the price conditions in the capitalist world market. In other words, the government support for exports usually means adjustment to the capitalist world market prices. The government subsidies serve to make competitive the goods that are produced under conditions actually less favorable than the international average. Government restrictions on imports, on the other hand, may imply the desire to have the capitalist world market prices adjust to the domestic prices. The greater the importance of a capitalist country in the capitalist world market, the more easily it can achieve this aim.

Lead and zinc prices, for example, are much higher on the New York commodity exchange than on the London exchange. The price differences can be attributed to the favoritism of the United States Government. In the United States, the demands for zinc and lead are supplied partially from domestic production and partially through imports. The domestic production costs of zinc and lead are higher than what they can be bought for on the capitalist world market. For years the government, through its stockpiling policies, has maintained a domestic price that corresponds to the domestic production cost. When conditions in the world market for colored metals became critical, the government--at the request of the monopolies--introduced import quotas for zinc and lead.

Under these import restrictions, the prices quoted on the New York commodity exchange can hardly be regarded as the capitalist world market prices. It is highly improbable that these prices are used in foreign trade. But it is permissible at all to regard a certain price as the capitalist world market price just because it is quoted on one commodity exchange within the capitalist market? It is very unlikely that a commodity exchange price based on import restrictions will be regarded as the export price. If two countries exchange zinc or lead, they usually refer to the prices quoted on the London exchange. Because of the restrictions imposed by the government, however, the exports of zinc and lead to the American market come under different consideration. The high prices on the New York commodity exchange not only ensure a profit for the domestic producers but also apply to imports. In this manner the American monopolists are also able to ensure high prices on the American market for the lead and zinc mined by their foreign interests.

The sales and purchases made at the international commodity exchanges, auction halls, and export-import company offices are usually occasional transactions. The intermediate- and long-term (3 to 5 year) delivery contracts of the monopolies are gaining in importance and are often concluded with the participation of the capitalist governments. Under monopolistic state capitalism, especially the goods whose volumes are large are traded at the prices specified in the intermediate- and long-term contracts. Transactions on the commodity exchanges, for example, how account for a comparatively small portion of the trade in sugar; the trade in colored metals is governed mostly be contracts between the capitalist groups in the metallurgical and the consumer industries, etc. In such contracts there is a tendency to stabilize the prices. Such price stabilization is effective when the contracts governing the supply are concluded by companies that have the same financial interests.

In the developed system of the capitalist world market, the purchasing companies may choose to a certain extent the market on which they wish to conclude their transactions. The companies that are the most interested in foreign trade deals have extensive international market research, brokerage, and arbitration networks. The same considerations have led to the development of a highly organized communication system tha that links the pincipal points of the world market and supplies information on prices, terms, and the more important transactions. Thus, although the capitalist world market price of

specific goods at a given time may vary geographically, the price trends--discounting certain exceptions--are identical and differ only in their phase.

This brief outline of the characteristics of the capitalist world market price can serve as a basis for discussing the problems arising from the fact that the socialist countries in their mutual trade relations take into consideration the capitalist world market price. It would be a mistake to assume that a certain adaptation of the socialist world market prices to the capitalist world market prices has only advantages but no drawbacks for the socialist countries. Both the advantages and the drawbacks came to light in the course of the debates preceding the adoption of the new price policies in foreign trade.[1]

1. If price determination in the socialist world market takes into consideration the price trends of the capitalist world market, our first problem is whether this involves the potential hazard of letting the cyclical anarchic phenomena of the capitalist economy penetrate into the socialist world market--whether the anarchy in the production of the capitalist countries can affect the production and foreign trade of the socialist countries. Under the influence of the price changes in the capitalist world market, the socialist countries might alter their production structures or conclude export-import agreements; or even without these consequences, the capitalist world market prices might affect the distribution of the socialist countries' combined total national income. This was self-evident during the large-scale speculative price fluctuations in the capitalist world market in 1949-1950, making it inevitable to freeze the prices [in the socialist world market]. What happened then might recur at any time but to a lesser extent. The only difference is in the amount of danger involved.

2. If the mechanical transplantation of the capitalist world market prices into the socialist world market is impractical, is it feasible to delimit the prices of the two world markets by averaging the annual price fluctuations? Doesn't this involve the possible danger that in accepting the average capitalist prices for the preceding year as the socialist world market prices we might get distorted version instead of the true capitalist world market prices? Are there any criteria by which we can determine what the capitalist world market prices would be if they were stripped of their irregularities? We know the factors that influence the capital-

ist world market prices. They are the following: the monopolies and their business policies; the dependence of the colonial and semi-colonial nations on the leading capitalist countries; the eccentricities of the economic trends; the political, military, strategic, and other factors. These factors are intermixed and are reflected in the price conditions. Stripped of these factors, the prices would reflect the relative value of the productivity of labor, or the comparative changes that have occurred in the productivity of labor. But is it possible at all to strip the capitalist world market prices of these factors?

3. Assuming that the capitalist world market prices can be stripped of these irregularities and that the prices thus obtained reflect the international value relations of this market, would it be at all advantageous for the socialist countries for the prices of their world market to reflect the capitalist world market prices? Would it not be desirable for the socialist countries to have a price basis of their own and to let their prices reflect the values of the socialist world market? To adapt its prices to the international values of the capitalist world market is understandably a heavy burden for a socialist country when its production conditions for a certain product are the best in relation to the socialist world market but are poor in comparison to the international values of the capitalist world market--i.e., when the socialist country raises its production to the level of the demands of the Soviet bloc but must export at the price that corresponds to the international value [of the product] in the capitalist world market.

4. Naturally, the problem of the fundamental causes of the similarities (or differences) in the prices on the two world markets will not arise as long as the socialist world market prices completely agree with the capitalist world market prices. But as soon as the socialist world market prices deviate from the capitalist world market prices it is inevitable to answer the questions concerning the essence and feasibility of the foreign trade prices. Thus, among other things, if the price changes in the capitalist world market are not such as to warrant price changes in the trade among the socialist countries, why are the prices actually used acceptable? Is it justifiable to assume that only the capitalist worl market prices have the qualities that can best serve as the basis for the international division of labor among the socialist countries? Indeed, the wider the deviations of the socialist world market prices from those of the capitalist

world market, the more pressing is the problem of a separate price system for the socialist world market, including the theoretical substantiation of the relations between the price systems of the two world markets. That is to say, the international division of labor among the socialist countries serves to ensure their independence in relation to the capitalist world market and cannot lack a price system that meets the requirements of such cooperation. In other words, the reasons that have led to the departure from the capitalist world market prices, and to specified deviations from the capitalist world market prices since 1957, also lead to the necessity of converting to a separate price basis that applies the principles of socialist price determination.

Problems of Departure from the Capitalist World Market Prices

The problems caused by the application of the capitalist world market prices in the socialist world market lead to the conclusion that in the socialist world market we must apply the principles of socialist price determination as soon as possible. The separate price basis of the socialist world market could be built on the average production indices of the socialist countries. These ratios would reflect the values determined by the production conditions in the socialist countries. The urgent development of a separate price basis is supported by the fact that a price system based on average production costs would ensure in the socialist world market the equal sharing of the advantages arising from foreign trade and would outline an international division of labor that would promote the more efficient utilization of live and materialized labor.

But the conversion to a separate price basis also involves certain problems:

1. Owing to the national characteristics knherent in the price system of the individual socialist countries, their production cost data are not directly comparable and are therefore unsuitable for determining the average production costs. Consequently, separate production cost categories would have to be construed for this purpose. To compute the production costs it would be necessary to develop uniform methods that would permit international comparisons. At its

November 1959 session the CEMA Permanent Economic Committee worked out a program and the basis for the development of uniform methods for computing production costs.[2] It will be many years before these methods result in production cost data suitable for determining foreign trade prices. We must realize that both the economic and the administrative aspects of this task are extremely complex.

2. A further problem in connection with the development of a separate price basis concerns the selection of the period of production conditions to which the prices should be adjusted. Should the prices be based on the production costs obtained in the analysis of the production conditions that existed one or two years before the prices become effective? Or should the prices be based on preliminary cost estimates, in which case it can be assumed that the estimated costs reflect the production conditions that will exist when the prices go into effect? And at what intervals should these prices be modified?

In considering these questions we must not depart from the technical conditions under which we determine our [domestic] official prices. It is a well-known fact that for most products it is easier to compute the production costs in retrospect than to estimate in advance their probable development, depending on specific changes that can be expected in the structure and conditions of production. We also know that it requires one to two years to work out the [domestic] price system of one country. We have no experience on the problems that might arise when this work has to be done in cooperation with several countries. On the basis of our present experience, we may assume that in working out a separate price system for the socialist world market we will be able to determine only prices of the type similar to the fixed producer prices in the socialist countries.

The domestic producer prices are fixed prices that reflect the production cost only at a given time. The fixed domestic prices do not react to the constant changes in the amount of work required. Partially because of the technical complexity of working out the price modifications, and socialist countries change their producer prices at fairly long intervals, when the changes in production conditions become substantial and widespread. Thus, the producer prices reflect the amount of work required at two different periods but less so in the comparatively long interval between them. With unchanging prices, improving labor productivity results in a

regular increase in the net social income included in the prices. The reduction of production cost in the socialist countries is now being measured with the development of this net social income. The nature of the socialist world market prices would be similar to that of these domestic producer prices.

On the other hand, however, the rigidity of price determination is becoming an increasing problem even with regard to the domestic producer prices. The rigidity of the prices over a period of several years would involve even more problems when these prices are used in foreign trade. Detailed studies are undoubtedly essential to developing methods whereby the principles of socialist price determination could be applied in conjunction with the periodic revision and, if necessary, annual adjustment of the existing prices.

3. The development of a separate price basis for the socialist world market would result in differences between the prices of the two world markets, not only because in the capitalist world market many factors cause the prices to deviated from the values but also because the values of the world markets differ. In comparison to the present conditions, the situation can be summed up as follows: today the prices of the socialist world market follow the capitalist world market prices in a specified manner; after the introduction of a separate price basis, however, the two prices would completely depart from each other.

This theoretical complete departure would also mean two substantially different prices (price ratios) in practice. This would raise problems arising from the trade relations between the two world markets. Would it then be practical for the socialist countries to judge the efficiency of live and materialized labor by standards applicable only to the socialist world market? Would it be permissible to disregard the question of economy in the ineernational division of labor that actually exists between the two world markets? Would it be justifiable to regard the capitalist world market as a uniform market? The fact that we are now witnessing increasing trade activity between the two world markets and closer cooperation between the socialist countries and the colonial, semi-colonial, and other nations dependent on the capitalist world market serves to emphasize the importance of these pboblems.

And finally, we must not overlook the experience we have gained since the price freeze. A peculiar situation has developed from the existence of two separate prices for one and the same product. The individual socialist countries have often been able to buy or sell a certain product on either of the two world markets. Under these circumstances, the individual socialist countries have often felt tempted to sell on the capitalist world market it its prices were the higher, or to buy there if its prices were lower. Thus, the existence of the two separate prices has caused a conflict of interest among the socialist countries. It might have been in the interest of the importing country to buy on the socialist world market, while the exporting country might have fared better to sell on the capitalist world market. Or it might have been more advantageous for a socialist country to sell on the socialist world market, while the other socialist countries might have made a better bargain on the capitalist world market.

The trade relations among the socaalist countries are carefully planned, the quotas are specified in the bilateral contracts, and the advantages or disadvantages arising from their mutual foreign trade can be judged only on the basis of the price system for the entire export and import. Experience has shown, however, that gaps between the prices of the two world markets serve to loosen rather than to consolidate the economic cooperation among the socialist countries. This was one of the reasons that the socialist countries in 1957--at the time of their introduction the socialist world market prices were completely identical with that of the capitalist world market prices but by 1957 they completely departed from the latter--did not replace the frozen prices with new ones corresponding to the values of the socialist world market but introduced instead a foreign trade price policy that approximates the prices of the two world markets.

* * *

The method of price determination introduced in the socialist world market in 1957 can be regarded as necessary and suitable under the existing conditions. The new method of price determination has produced conditions more favorable than the one which developed as the result of the unavoidable price freeze, when the prices failed to express the values

of either world market. The new foreign trade price policy, however, cannot claim to have provided the scientific basis for the application of the principles of socialist price determination in the trade relations among the CEMA countries. The economists who to date have expressed their views on this problem generally agree in that it will be necessary in the future to apply separate principles for price determination in the socialist world market.

The differences of opinion among the economists participating in this debate concern mostly the prerequisites for conversion to a separate price basis. Some economists regard this problem as a simple economic and administrative task. Others regard the creation of a separate price basis, entirely independent of the capitalist world market prices, as a process of development in which adopt the already existing progressive elements of price determination, gradually adding to them the new elements that arise from the improving economic cooperation among the CEMA countries. This process of development is determined by several factors. One such factor is that the socialist countries, by rapidly developing their economies, will increase the ratio of their production in proportion to the total world output and will within a comparatively short time account for more than one half of the total world output. In this manner, the socialist countries will achieve a dominant role in production and in foreign trade, which in turn will increasingly affect the capitalist world market and its prices. Another factor is that--parallel with the development of the socialist world--the productivity of labor is rising, production costs are dropping, and the prices reflecting the values of the socialist world market might in general come closer to the capitalist world market prices. Consequently, the gradual conversion to a separate price basis for the socialist world market can take place at a time when the differences between the prices of the two world markets will not be so great, even though two separate price systems exist. The third factor is that through the CEMA the economic cooperation among the socialist countries is progressing considerably and the socialist world market is becoming better organized. This development increasingly permits us to utilize the positive rather than the negative functions of the prices (or of their deviations from the capitalist world market prices) and to employ them as a means for improving the economic cooperation and the international division of labor among the CEMA countries. The fourth and last factor is connected with the development of uniform methods for computing production costs. Parallel

with the analyses of the domestic price systems, it will be possible to approximate to a certain extent the principles and methods used in determining the domestic prices. Consequently, it will be possible to determine the socialist world market prices on the basis of the domestic prices, provided that certain corrections are made.

In summary, the present socialist world market prices cannot be explained separately but only in their relation to the capitalist world market prices. At present the socialist world market prices are derived in a specified manner from the capitalist world market prices. At a further stage of development, however, the socialist countries in their mutual foreign trade will used prices that reflect the production conditions of the Soviet bloc. Ghese prices will be explicable in themselves, and their relation to the capitalist world market prices--after they are stripped of their irregularities--will express the differences in the values of the two world markets.

Long after they have introduced their own prices for their processing industry products (primarily for their machine industry products), the socialist countries will foreseeably still be adapting their raw material prices to the capitalist world market prices. (The influence of the socialist countries on the raw material prices in the capitalist world market is constantly increasing.) This prediction is substantiated by the fact that the development of the capitalist world market prices for raw materials can be followed fairly clearly, while the same thing can hardly be said of the capitalist world market prices for the products of the processing industries--primarily the machine industry. Consequently, the adoption of commensurate prices for products of the processing industry necessitates the application of the principles of socialist price determination, regardless of whether or not the socialist world market adjusts its price ratios (raw materials versus raw materials, and raw materials versus finished products) to the price trends of the capitalist world market. This fact, among other things, also justifies the present attempt to solve the problems connected with the introduction of a separate price basis for the socialist world market.

Footnotes

[1]In the evaluation of the new price policies that were introduced in foreign trade in 1957, I have utilized the documents dealing with the conversion to a separate price basis in the socialist world market. These documents were prepared and exchanged by the individual CEMA countries.

[2]For details see Bela Csikos-Nagy: "The International Comparability of Production Costs," Kozgazdasagi Szemle, No 10, 1959.

1014

HUNGARY

Investigation of the Labor Requirements of Maintenance in the Coal Mining Industry

[This is a translation of an article by Laszlo Heja in Banyaszati Lapok, Vol XCII, No 12, December 1959, Budapest, pages 819-828; CSO: 3452-N]

In the coal mining industry maintenance is one of the most labor-consuming activities. Maintenance shifts generally constitute about 12 to 13 percent of all working shifts.

I. Development of Maintenance from 1949 to the First Half of 1958

In recent years the increasing coal production has caused considerable changes in maintenance requirements, the length and condition of tunnels, and the combination of various maintenance operations per type of work.

The primary task of this article is to investigate the development of maintenance from 1949 to the first half of 1958 and secondly, to examine the maintenance requirements at the mining enterprises in the third quarter of 1958.

Between 1949 and the first half of 1958, the development of the production, tunnel length, and maintenance utilization was as plotted in Figure 1.

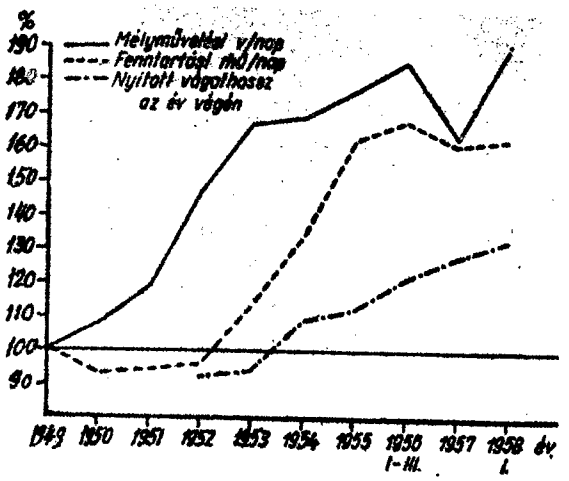


Figure 1. Production, Tunnel Length, and Maintenance Shifts

——— Daily production

------ Maintenance shifts per day

—.—.—. Tunnel length at the end of the year

No data is available on the tunnel lengths in 1950 and 1951.

a) In spite of the increasing production, the daily number of maintenance shifts did not substantially change in 1949 to 1952; in 1952 it was even less than in 1949.

In these years the industrial boom required an increased coal production. However, maintenance was largely neglected because of the acute shortage of qualified miners. As can be seen from Table 1, the proportion of maintenance shifts has gradually declined.

Table 1

Proportion of Maintenance Shifts

	1949	1950	1951	1952
In percent of productive shifts	39.0	37.3	34.2	32.1
In percent of all shifts	12.7	11.9	11.0	10.2

b) In 1953-1955, the number of maintenance shifts increased again; this was made possible by a substantial increase in the number of qualified miners. In 1954 and 1955 a decreasing tendency in Sunday production shifts became another contributing factor. It should be noted, however, that even these changes were not enough to substantially improve roadway conditions. The increasing number of maintenance shifts is closely connected with the increased length of opened tunnels and the extensive application of beam supports.

c) Since 1955, maintenance utilization has remained approximately at the same level. After a short setback in 1957, production increased again, together with the length of opened tunnels; the utilization of shifts shows a decreasing tendency in both production and tunnel length opened.

The decrease in maintenance requirements which stemmed from better mining conditions has been facilitated by the extensive application of beam supports.

In the past few years particularly, the TH hooped support and the Moll-arch have gained wide application.

* * *

Since the statistical evaluation of maintenance shifts was started in 1953 alongside the extensive application of the above-mentioned beam supports, in the following discussion of maintenance developments we shall use 1953 as a base period, although this choice has certain disadvantages from the viewpoint of economy; the average production index shows the marked effects of over-strain in the first six months and a general slackening in the second.

Any increase in the production leads to a certain degree of increase in the tunnel length, which in turn increases the need for more maintenance shifts.

The ratio of maintenance and production--in shifts per 1,000 tons--has been defined as the labor requirements of maintenance. Compared to 1953, this ratio has been gradually increased. The indices of this development can be seen in Table 2.

Table 2

	1953	1954	1955	Quarters I to III 1956	1957	First Half 1958
Percent	100	116.7	134.6	137.8	145.2	126.2

Actually, the labor requirements of maintenance are determined by the specific length of the tunnesl (kilometers per production) and the number of maintenance shifts per tunnel length unit (shifts per kilometer), as expressed in the following formula:

$$\frac{\text{Daily shifts}}{\text{Daily carloads}} = \frac{\text{Kilometers}}{\text{Daily carloads}} \times \frac{\text{Daily shifts}}{\text{Kilometers}}$$

As can be seen from the above formula, an increase in any of the components--while the others remain constant--results in a rise in maintenance requirements.

In 1953-1958, the increased maintenance requirements were caused by a slight increase in both components.

1. Development of the Specific Length of Tunnels Opened

From 1949 to the first half of 1958, the development of the average production and opened tunnel length can be followed in Table 3.

Table 3

	1953	1954	1955	Quarters I to III 1956	1957	First Half 1958
Average daily production, in percent	100	101.4	106.2	111.8	97.9	113.9
Length of tunnels in percent	100	116.4	119.2	128.7	136.3	142.5

The advancement in tunnel length was greater than that in production; thus, the specific tunnel length (kilometers per daily carloads) has increased. In 1953, the specific tunnel length was 0.160 kilometers per daily carload, while in the first half of 1958 it was 0.2 kilometers per daily carload. These developments are shown in Table 4.

Table 4

Specific Tunnel Length in Kilometers per Daily Carload

Mining Enterprise	First Half 1958*	1953	1955	First Half 1958
Komlo Trust	68.3	0.319	0.230	0.218
Dorog Trust	91.6	0.191	0.161	0.175
Hidas Enterprise	93.6	0.078	0.084	0.073
Varpalota Trust	102.1	0.140	0.109	0.143
Tatabanya Trust	107.1	0.141	0.123	0.151
Oroszlany Enterprise	114.9	0.087	0.104	0.100
Nograd Trust	115.6	0.167	0.181	0.193
Matravidek Trust	124.8	0.101	0.117	0.126
Pecs Trust	134.2	0.161	0.169	0.216
Kozepdunantul Trust	162.0	0.100	0.141	0.162
Borsod Trust	167.7	0.217	0.319	0.364
Ozdvidek Trust	175.9	0.212	0.312	0.373
Pilis Enterprise	245.5	0.066	0.718	0.612
National Average	125.0	0.160	0.719	0.200

*1953 = 100 percent

The development of the specific tunnel length is generally determined by the changing production of the individual mines belonging to the various mining enterprises.

The specific tunnel length of the individual mines is closely connected with the operating time, the quantity of production, the method of extraction, the concentration of the mining processes, and the preparations for the next production period.

Among the mining enterprises, the following have higher than average ratings concerning specific tunnel length:

Mining Enterprise	Percent
Pecs Trust	34.2
Kozepdunantul Trust	62.0
Borsod Trust	67.7
Ozdvidek Trust	75.9
Pilis Enterprise	145.5

2. Maintenance Utilization per Tunnel Length Unit

Besides, the specific opened tunnel length, the labor requirements of maintenance are also influenced by the utilization of maintenance shifts per tunnel length unit.

Table 5 shows the development of maintenance utilization and tunnel length from 1953 to the first half of 1958.

Table 5

	1953	1954	1955	Quarters I to III 1956	1957	First Half 1958
Daily maintenance shifts in percent	100	118.4	143.0	148.5	142.1	143.8
Tunnel length at end of period, in percent	100	116.4	119.1	128.7	136.3	142.5

In maintenance utilization in 1955 to 1957 the rate of growth was considerably higher than that of the tunnel length.

In the first half of 1958 the percentual increase was almost the same in both indices, indicating that the increased shift utilization was exclusively the result of the rising tunnel lengths.

The daily number of maintenance shifts per tunnel length unit is shown in Table 6.

Table 6

	1953	1954	1955	Quarters I to III 1956	1957	First Half 1958
Number of shifts per day per kilometer	6.78	6.89	8.14	8.11	7.07	6.84
Development in percent	100	101.6	120.1	119.6	104.3	100.9

The shift utilization per kilometer index reached its peak in 1955 and 1956, at about 20 percent above the figures of 1953; in the first half of 1958 it was only 0.9 percent higher than the 1953 value.

The shift utilization per tunnel length unit index increased in 1955; however, in the first half of 1958 a decreasing tendency developed in almost all mining enterprises, as compared to the 1955 values.

Table 7

Daily Number of Maintenance Shifts per Tunnel Length Unit
(Shifts per Day per Kilometer)

	1953	1955	First Half 1958	First Half 1958 1953 = 100	First Half 1958 1955 = 100
Komlo	7.5	10.6	10.6	141.3	100.0
Pecs	6.1	6.4	6.0	98.4	93.8
Dorog	10.5	15.1	13.8	131.4	91.4
Pilis	30.1	15.0	13.8	45.8	92.0
Oroszlany	5.7	7.9	7.3	128.0	92.4
Tatabanya	11.3	17.7	11.7	103.5	66.1
Borsod	3.9	4.7	4.1	105.1	87.2

[table continued]

[Table 7 continued]

Kozepdunantul	6.2	6.7	4.8	77.4	71.6
Nograd	5.5	6.1	6.0	109.0	98.4
Ozdvidek	8.0	10.1	7.2	90.0	71.3
Matravidek	4.7	4.1	3.6	76.6	90.2
Varpalota	3.3	5.5	4.9	148.5	89.1
Hidas	13.4	11.6	19.8	138.5	170.7
National Average	6.78	8.14	6.84	100.9	84.0

On the basis of the 1954 data on maintenance activities, it can be assumed that in 1953 the length of tunnels of inadequate safety also increased. Consequently, the maintenance activity in 1953 and 1954 was not sufficient to improve the poor conditions of the mines worsened by over-strained production.

During 1955 the condition of the tunnels considerably improved, thanks to increased maintenance activities. The length of unsafe tunnels substantially decreased between 1955 and the first half of 1958.

Table 8

Unsafe Tunnel Length in Proportion to Total Tunnel Length
(in percent)

	At the end of:				
	First Quarter		Third Quarter		First Half
1953	1955	1955	1956	1957	1958
25.1	26.8	22.3	20.5	15.9	14.5

The extensive use of beam supports was primarily responsible for the evidently improving tunnel conditions.

Between 1953 and the first half of 1958, the proportion of beam supports increased as shown in Table 9.

Table 9
(In Percent)

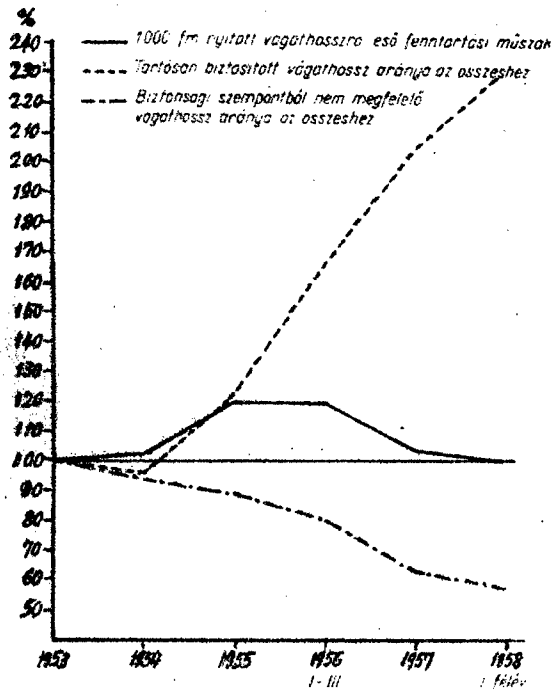
	1953	1954	1955	1956	1957	First Half 1958
Tunnels secured by beam supports	13.8	13.2	16.9	22.9	28.3	31.9
Development	100.0	95.7	122.5	165.9	205.1	231.2

The rising percentage of beam supports can be attributed to the extensive use of TH and Moll supports.

Table 10
(In Percent)

	1953	1954	1955	1965	1957	First Half 1958
TH and Moll supports	2.8	4.1	5.7	9.5	13.8	17.1
Other beam supports	11.0	9.1	11.2	13.4	14.5	14.8

The development of maintenance activities, beam-supported tunnels, and unsafely supported tunnels between 1953 and the first half of 1958 has been plotted in Figure 2.



I to III Quarters — First Half

Figure 2

Development of Maintenance and Roadway Conditions

——— Maintenance shifts per 1,000 meters of tunnel length

------ Beam-supported roadways

-.-.-. Unsafely supported roadways

As the diagram shows, in 1955 the increased use of beam supports resulted in a sudden increase in maintenance shifts. In this year the TH and Moll type supports were used mainly in modifying the main galleries; thus the shift utilization takes on the form of maintenance shifts. In subsequent years, the length of beam-supported tunnels increased faster than the utilization of maintenance shifts; this points to the fact that the beam supports were used primarily in new headings rather than in modifying the present tunnels. Therefore, the major part of the supporting work has been accounted for in the advance shifts.

In spite of the slight decrease in maintenance shifts in 1957 and the first half of 1958, the considerable increase

in beam-supported tunnels has substantially improved the tunnel conditions by reducing the need for maintenance. In the first half of 1958 the index of the number of shifts per day per kilometer was almost equal to that in 1953; the only difference was that in 1953, with the same amount of work, almost one-fourth of the tunnel length did not meet safety requirements and tunnel conditions were gradually deteriorating. In the first half of 1958 the unsafe tunnels constituted 14.5 percent, which shows a marked improvement in comparison with the 1957 data.

In the investigation of maintenance shifts related to the installation of beam supports, it should be considered that the TH and Moll type supports have been used not only on permanent main galleries but also on ventilation and track adits. The use of the TH and Moll supports in main galleries and subdrifts can be evaluated from Table 11.

Table 11

	Main Galleries	Other Adits
	(in percent)	
At the end of 1953	85.5	14.5
At the end of 1955	73.8	26.2
In the first half of 1958	68.3	31.7

In the use of TH and Moll type supports in subdrifts and auxiliary extraction galleries, no maintenance work can be saved, primarily because they are general used under unfavorable country rock and pressure conditions, where timber settings were not sufficient, and secondly, because when the longwall is advanced, before abandoning the entry, the support elements are reclaimed and replaced with timber settings; This work also represents a load on the maintenance shifts.

We also have to consider the fact that at some mining enterprises the work is accomplished under much less favorable conditions than existed in 1953 and 1955; this also increases the need for more maintenance shifts.

Table 12 shows the proportions of beam-supported and unsafe tunnels in 1955 and the first half of 1958, and the development of maintenance utilization per tunnel length unit in the first half of 1958, as compared to 1955.

Table 12
(In Percent)

Mining Enterprise	Beam-Supported Tunnels 1955	Beam-Supported Tunnels 1st Half 1958	Unsafe Tunnels 1955	Unsafe Tunnels 1st Half 1958	Shifts per Day per Kilometer, 1st Half of 1958 (1955 = 100 %)
Komlo	19.5	50.2	20.8	10.3	100.0
Pecs	12.8	22.8	20.4	17.8	93.8
Dorog	21.5	34.2	24.5	14.7	91.4
Pilis	3.7	5.9		10.6	92.0
Oroszlany	4.2	22.1	20.9	27.9	92.4
Tatabanya	32.8	57.3		12.9	66.1
Borsod	14.5	19.5	23.7	11.3	87.2
Kozepdunantul	16.6	42.4	24.5	15.8	71.6
Nograd	7.4	13.5	21.8	16.1	98.4
Ozdvidek	21.4	43.4	26.8	18.4	71.3
Matravidek	30.7	41.9	15.0	18.0	90.2
Varpalota	22.3	46.1	16.6	4.2	89.1
Hidas	17.8	40.3		6.1	170.7
National average	16.9	31.9	22.3	14.5	84.0

Generally the tunnel conditions have improved considerably and the shift utilization increased wherever beam-supporting techniques have been employed.

The highest rate of decrease in the index of maintenance utilization per tunnel length unit is noticeable at the Tatabanya, Kozepdunantul, and Ozdvidek Mining Enterprises, where the proportions of beam-supported adits are as high as 40 percent; the proportions of TH and Moll supports are the highest among these mining enterprises (43.8 percent in Tatabanya, 29.4 percent in Kozepdunantul, and 27.9 percent in Ozdvidek of the total tunnel length opened).

At the Kozepdunantul and Ozdvidek Enterprises, the shift utilization (number of shifts per day per kilometer) has been even lower than in 1953. At the Tatabanya Enterprise a 3.5-percent increase can be observed in the index of shifts per tunnel length unit, which can attributed to unfavorable mining conditions.

At the Komlo Mining Enterprise, the idex of shift utilization per kilometer in the first half of 1958 was the same as in 1955, while at the Hidas Enterprise it surpassed this level.

The evident improvement in tunnel conditions points to the increased number of shifts used for support modification--that is, to the extensive use of beam supports in the present tunnels.

* * *

In terms of the total mining industry, the labor requirements of maintenance increased by 26.2 percent over 1953, owing to the increases in the specific tunnel length (25 percent) and the shift utilization per kilometer (0.9 percent).

The labor requirements of maintenance were higher in the first half of 1958 than in 1953, except for the Komlo and Matravidek Enterprises. This was caused in some cases by the increasing specific tunnel length and in others by the increasing index of shift utilization per kilometer.

Table 13

Mining Enterprise	Labor Requirements: Daily Shifts / Daily Carloads	Specific Tunnel Length: Kilometers / Daily Carloads	Shift Utilization: Daily Shifts / Kilometers
	(1st half 1958 in percent of 1953)		
Matravidek	95.8	124.8	76.6
Komlo	97.0	68.3	141.3
Tatabanya	111.2	107.1	103.5
Pilis	112.0	245.5	45.8
Dorog	121.0	91.6	131.4
Kozepdunantul	124.3	162.0	77.4
Nograd	125.0	115.6	109.0
Hidas	128.3	93.6	138.5
Pecs	131.3	134.2	98.4
Oroszlany	146.0	114.9	128.0
Varpalota	152.2	102.1	148.5
Ozdvidek	158.0	175.9	90.0
Borsod	175.3	167.7	105.1
National average	126.2	125.0	100.9

The specific tunnel length and index of shift utilization per kilometer in 1953 and the first half of 1958 have been plotted in Figure 3.

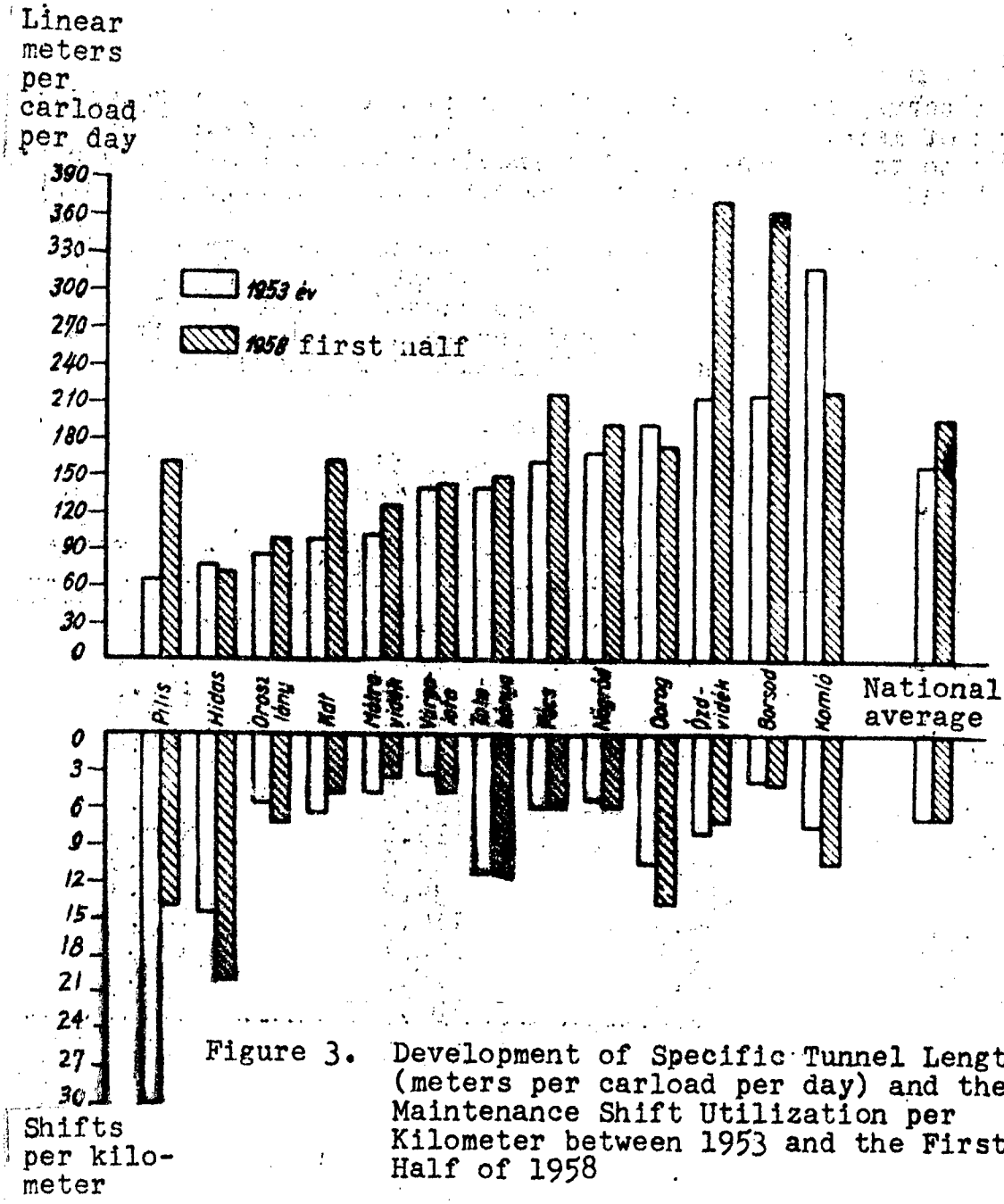


Figure 3. Development of Specific Tunnel Length (meters per carload per day) and the Maintenance Shift Utilization per Kilometer between 1953 and the First Half of 1958

II. Comparison of Mining Enterprises Concerning Maintenance Requirements

In the above discussion the dynamic development of the labor-consuming maintenance processes was presented in conjunction with the specific tunnel lengths and shift utilization. However, it is equally important to analyze and compare the maintenance requirements of the individual mining enterprises.

A reliable comparison can be established only if we know the structure of the maintenance shifts. Since data have been obtained only for the third quarter of 1958, in the following we shall discuss the maintenance activities at the mining enterprises for this period.

Table 14

Mining Enterprise	Shifts per Day per Carload
Matravidek	0.39
Oroszlany	0.64
Varpalota	0.68
Kozepdunantul	0.71
Nograd	1.25
Pecs	1.31
Borsod	1.43
Hidas	1.46
Tatabanya	1.64
Komlo	2.26
Dorog	2.31
Pilis	2.46
Ozdvidek	2.54
National average	1.34

In the Nograd, Borsod, Tatabanya, Pecs, Komlo, Dorog, Ozdvidek, Pilis, and Hidas mining enterprises, the labor requirements of maintenance are equal to or higher than the national average.

In the various mining enterprises, the indices of specific tunnel length and invested work per kilometer have different effects on the labor requirements of maintenance. Table 15 shows the enterprises grouped according to the factors that generally increase the labor requirements of maintenance.

Table 15

Mining Enterprises	Labor Requirements: Daily Shift Daily Carloads	Specific Tunnel Length: Kilometers Daily Carloads	Average Shift Utilization per Kilometer: Daily Shifts Kilometer
With higher than average specific tunnel length:			
Komlo	2.26	0.235	9.65
Pecs	1.31	0.216	6.06
Nograd	1.25	0.216	5.79
Borsod	1.43	0.384	3.72
Ozdvidek	2.54	0.381	6.66
With higher than average shift utilization per kilometer:			
Pilis	2.46	0.166	14.83
Dorog	2.31	0.182	12.67
Tatabanya	1.64	0.150	10.98
Hidas	1.46	0.099	14.79
National average	1.34	0.214	6.27

1. In the bituminous coal mines and brown coal mines of Northern Hungary the relatively high labor requirements of maintenance are caused by the unusually long tunnels involved.

In the bituminous coal mines, firedamp, dispersed coal dust, and fire and explosion hazards require more intensive dressing (preparatory) procedures (such as burrow pits), which account for the longer tunnels.

At the Pecs Mining Enterprise the boundaries of the old mines have also been extended, as a result of which the average tunnel length has reached 28.3 kilometers in comparison with the national average of 10.4 kilometers.

The 35 to 36 smaller mines belonging to the Nograd and Borsod Enterprises have also added to the index of tunnel length while not contributing much to the over-all production.

The effect of extended boundaries must also be considered in certain mones of the Ozdvidek Enterprise (Somsaly, Farkaslyuk, Gyurki-taro, Egercsehi), as can be seen in Table 16.

Table 16

Mining Enterprise	Tunnel Length per Mine (kilometers)	Average Production per Mine
Komlo	12.3	52.2
Pecs	28.3	131.3
Borsod	11.2	29.0
Nograd	5.8	27.1
Ozdvidek	13.0	34.1
National average	10.4	47.4

In some mines of the Ozdvidek, Borsod, and Pecs Enterprises the decentralized working techniques and excessif preparatory work have also contributed to the unusually high tunnel length and increased maintenance activities. It would be worthwhile to investigate whether the high tunnel length is essential to keeping production at its present level.

2. At the Dorog, Tatabanya, Pilis, and Hidas Mining Enterprises, the maintenance requirements have been running high because of the unnecessarily large amount of work invested per tunnel length unit. The situation is similar at the Komlo Enterprise, where the indices of invested work per kilometer and the specific tunnel length are both excessively high.

At these mining enterprises the maintenance requirements can be divided according to type of work, as follows:

Table 17

Enterprise	Tunnel Supports	Dinting	Roof Control	Other Activities	Total
		(in percent)			
Komlo	79.9	3.2	2.6	14.3	100
Pilis	71.5	5.8	20.7	2.0	100
Dorog	64.6	6.4	18.8	10.2	100
Tatabanya	62.9	2.8	18.5	15.8	100
Hidas	94.1	3.4	0.1	2.4	100
Nat'l average	74.1	4.4	7.8	13.7	100

At the Komlo Enterprise the replacement of timber settings with beam supports constitutes about one-fifth of the total maintenance work invested, while at the Tatabanya and Dorog Enterprises the "other activities," such as shaft repairs, track laying, sump cleaning, material salvage, etc. represent 15.8 and 10.2 percent respectively. At the Pilis Enterprise stowing work and roof control are of main importance.

Generally, the major part of the work is concentrated in the maintenance of roadway supports; disregarding the shifts engaged in support replacements, the data on roadway support maintenance per tunnel length unit can be seen in Table 18.

Table 18

Shifts Engaged in Support Work
(in shifts per kilometer)

Mining Enterprise	Timber-Supported Tunnels	Beam-Supported Tunnels	Total	Beam- in Percent of Timber-Supported Tunnel
Komlo	9.65	1.90	5.51	53.4
Pilis	10.33	7.45	10.18	6.7
Dorog	10.70	2.53	7.76	36.0
Tatabanya	11.18	2.40	6.01	58.9
Hidas	19.27	2.99	12.57	41.2
National average	5.11	1.78	4.00	33.3

The above table clearly indicates that the maintenance requirements of the above mining enterprises for timber-supported tunnels are two to three times or even four times (Hidas) as high as the national average; this can be explained by the unfavorable geological conditions, such as high pressure, working under partially sabulous layers (Tatabanya), and reworking previous abandoned tunnels (Dorog, Pilis); on the other hand, the maintenance requirements can be substantially reduced by the extensive use of beam supports.

* * *

In the coal mining industry, the total maintenance work invested per type of work is as follows:

Table 19

	Daily Maintenance Shifts	Percent
Supporting tunnels	7,325	74.1
Roof control	775	7.8
Dinting	440	4.4
Track laying	474	4.8
Other activities*	882	8.9
Total	9,896	100.0

*Shaft repairs, material salvage, sump cleaning, etc.

Roadway supporting work constitutes about three-quarters of the total maintenance work invested (74.1 percent).

Out of the daily average of 7,325 shifts, 5,385 (73.5 percent) were used for timber supporting work, 933 (12.7 percent) for beam supporting work, and 1,007 (13.8 percent) for modifying work--i.e., replacing timber settings with beam supports.

In the third quarter, modifying work was undertaken on 14.3 tunnel kilometers, of which 9.3 kilometers were main galleries and 5.0 kilometers were other entries.

Particularly intensive modifying work has been done at the Komlo, Pecs, Matravidek, and Varpelota Mining Enterprises, where the shifts engaged in modifying work constituted 20.6 to 28.5 percent of the total maintenance shifts, and at the Tatabanya, Kozepdunantul, and Ozdvidek Enterprises, where the corresponding index was 11 to 17 percent respectively.

An average of 5.5 shifts are required to modify one linear meter of timber supports.

If the 9-kilometer increase in TH and Moll supported tunnels in 1953 is assumed to be entirely the result of modifying work, the number of shifts invested comes to 49,500 or 162 shifts per day. The index of maintenance utilization per tunnel length unit shows a 15-percent decrease (1953 = 100 percent) if we disregard the number of shifts invested for modifying work in both periods, as shown in Table 20.

Table 20

	1953	1st Quarter 1958	Development in Percent
Number of maintenance shifts per kilometer of tunnel (without modifying shifts)	6.62	5.63	85.0

In the coal mining industry such extensive modification is usually only of a temporary nature; therefore, in the following we shall entirely disregard these activities.

The labor requirements of road supporting work is of course different at the various mining enterprises--as we have previously pointed out--partly because of the varying country rock formation and pressure conditions and the various supporting techniques used.

The labor requirements of timber setting are considerably different from those of beam support. In the third quarter of 1958 about 11 percent of the timber supports and 2.8 percent of the beam supports required complete overhaul, disragrding the modifying work done during the same period.

This means that the labor requirements for timber setting have been 3.9 times as high as those for beam supports.

In the utilization of shifts engaged in supporting work, this difference is not so obvious, because to replace one linear meter of beam-supported tunnels requires about 1.6 times the labor needed to replace one linear meter of timber-supported tunnel.

In the third quarter of 1958, 66.7 percent of all tunnels were supported with timber and 33.3 percent with beams.

About 85.2 percent of the shifts were engaged in timber setting, while about 14.8 percent worked on beam supports.

About 5.11 shifts per day were required per kilometer of timber-supported tunnels and about 1.78 shifts per day per kilometer of beam-supported tunnels.

Table 21

Number of Shifts per Day per Total Tunnel Length

	Timber-Supported Tunnels	Beam-Supported Tunnels
	(in kilometers)	
Number of shifts per day	5.11	1.78

In the above calculation we have considered the main galleries and the auxiliary tunnels as well. However, there is a substantial difference between the required number of shifts working on main galleries and other entries.

Table 22

Number of Shifts per Day per Total Tunnel Length

	Timber-Supported Tunnels	Beam-Supported Tunnels
	(in kilometers)	
Main galleries	4.86	1.60
Other entries	5.54	2.28
Total tunnels	5.11	1.78

Since the tunnels supported by concrete blocks, bricks, reinforced concrete beams, or blockwood do not require maintenance, the index of 1.78 shifts per day per kilometer refers only to the TH + Moll and other beam-supported systems. (For the TH and Moll supports, 3.2 shifts per kilometer are required [sic]).

Nevertheless, the use of TH and Moll supporting systems, and particularly concrete blocks, etc. generally reduce the number of maintenance shifts involved.

The rate of application of these methods is as follows:

Table 23

	1953 km	1953 %	Third Quarter 1958 km	Third Quarter 1958 %
TH and Moll	21.0	2.8	291.6	18.5
Other beam supports	127.2	11.0	234.1	14.8
Timber supports	923.1	86.2	1,053.8	66.7

Considering the above requirements, the shift utilization is as follows:

Table 24

	Number of Shifts per Day 1953	Third Quarter 1958
TH and Moll-supported tunnels	67	933
Other beam-supported tunnels	-	-
Timber-supported tunnels	4,717	5,385
Total	4,784	6,318

The above figures, in percentage of the total tunnel lengths, are as follows:

Table 25

	1953	Third Quarter 1958	Development in Percent
Number of shifts per day per kilometer	4.47	4.00	89.5

The difference of 0.47 shifts per day per kilometer multiplied by the present tunnel length of 1,579.3 kilometers represents a net saving of 742 shifts per day because of the increased use of beam supports.

III. Summary

We can conclude that the utilization of maintenance has increased faster than production as compared to 1953; thus the labor requirements of maintenance in proportion to production is higher than in 1953.

The total maintenance utilization was as follows:

Table 26

	1953	Third Quarter 1958
Shifts per day per kilometer	7,260	9,896

The labor requirements calculated for the specific tunnel length of 1953 are as follows:

Table 27

	1953	Third Quarter 1958
Shifts per day	7,260	7,365

Calculating the actual specific tunnel lengths with and without modifying activities, 7,089 and 8,889 shifts respectively were required.

Thus, under the present conditions, the result of the increased specific tunnel length was 9,896 - 7,365 = 2,531 shifts per day, while 9,896 - 8,889 = 1,007 shifts per day were used for modifying work. Without these, the number of maintenance shirts per day was 6,358, which constitutes 89.5 percent of the 1953 figures (disregarding modification), showing a decrease of 10.5 percent.

In the number of shifts engaged in supporting work, the decrease was also 10.5 percent, and the number of shifts engaged in activities other than the installation of supports also decreased by the same rate. This assumption has also been justified by the fact that the use of TH supports primarily decreases the number of dinting shifts, and their stability also has a favorable effect on track-laying work.

Consequently, the increase in the labor requirements of maintenance since 1953 has been primarily caused by the considerable increase in the specific tunnel length and secondarily by the modifying activities.

The latter cannot be classified as mere maintenance work, although they have been accounted for in maintenance statistics; on the other hand, it is assumed that this present high rate is only temporary and that it will decrease in the future.

The excessive increase in tunnel length over production constitutes a very unfavorable situation, which usually arises from decentralized working methods and sometimes excessive preparatory activities.

Finally, we have to emphasize again that, with the present rate of maintenance utilization, mining conditions are considerably better than they were in 1953, when over-strained production restricted the maintenance to only the most urgent jobs.

- END -

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